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ABSTRACT

Prepared by the Research and Development Division of the American College Testing (ACT) Program, this handbook contains information pertaining to the ACT Career Planning Program, a guidance program for students considering and entering post-high school career education programs. The primary instrument of the Career Planning Program is a Career Planning Profile (CPP) which students complete prior to entering post-high school education. This instrument consists of a vocational interest profile, eight ability measures, and student information regarding career decisions and educational planning. Most of the information in this handbook concerns the CPP and includes: (1) a discussion of the construction, content, and norming of the CPP, (2) information about the reliability and intercorrelation of CPP measures and their relationship to other similar measures, and (3) evidence of the criterion-related validity of CPP scales, including the effectiveness of the CPP in predicting student performance and in differentiating educational programs. General, program cluster, and special subgroup norms plus a listing of institutions administering the CPP during the norming period are appended. (SB)

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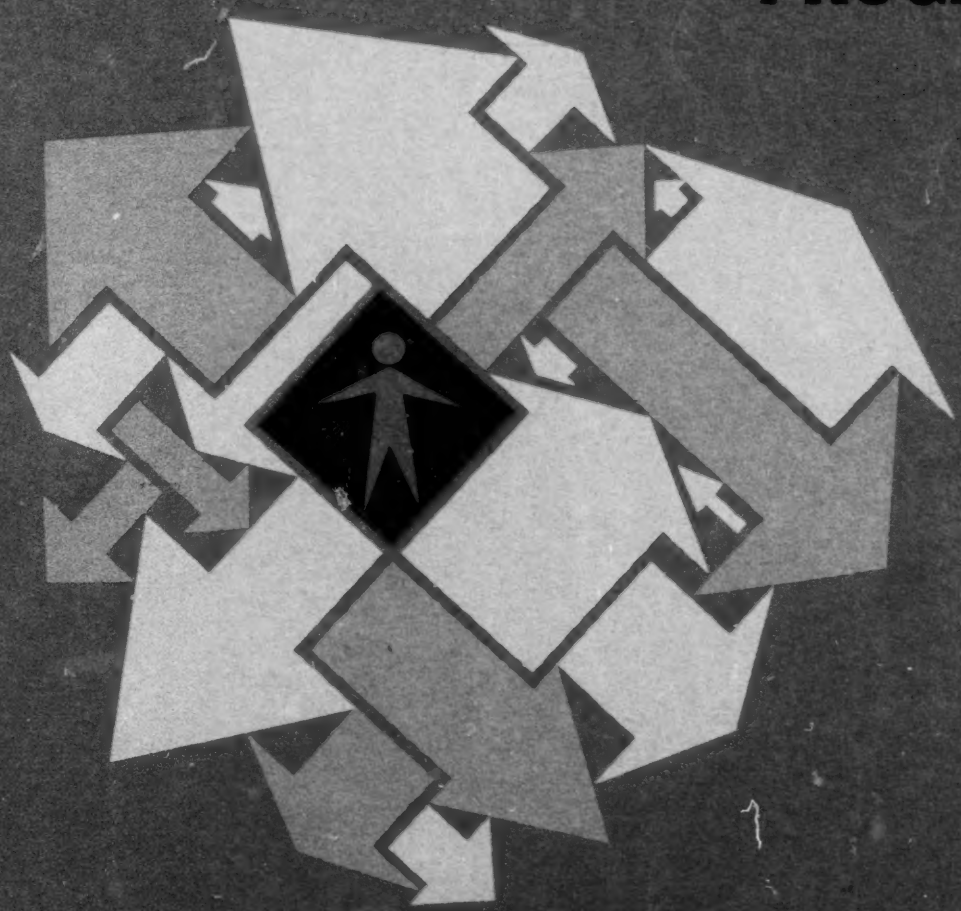

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THE AMERICAN COLLEGE TESTING PROGRAM

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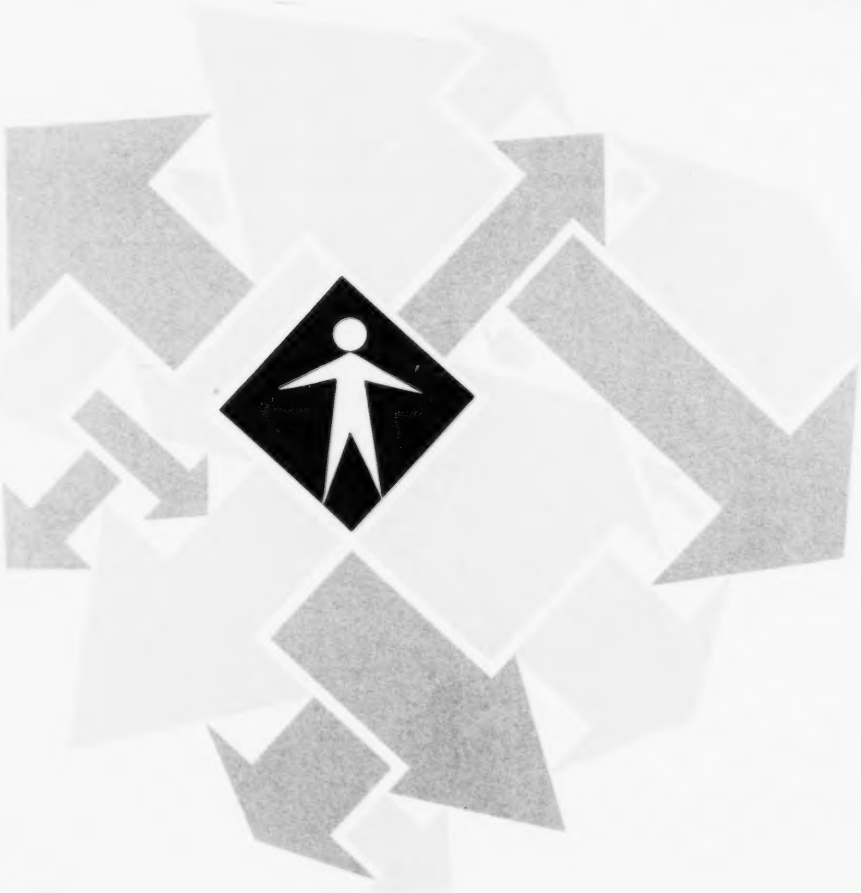

THE AMERICAN COLLEGE TESTING PROGRAM

The American College Testing Program is dedicated to the enrichment of education. It was founded as an inviolate public trust and operates as a nonprofit corporation governed by educational representatives from individual states or regions and a Board of Trustees.

A fundamental goal of The Program is to exercise educational leadership by conducting testing, information gathering, evaluating, and related activities in order to (1) assist in the identification and solution of educational problems and (2) communicate to the general and professional publics knowledge and ideas about education.

The chief beneficiaries of The Program's services are students, secondary schools, institutions of higher education, and educational researchers.

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PREFACE

Today vocational and technical education makes up a significant part of higher education. Encouraged by business and government, justified on both social and economic grounds, these educational programs attract more and more students. Many of these students arrive at the institution with hope but vague or indefinite plans, and need educational-vocational guidance as well as vocational preparation. The Career Planning Program is designed for guidance use with students considering and entering all types of post-high school career education programs. With the help of counselors, advisers, and this service, students can make better career decisions and more rational educational plans.

The Career Planning Program brings several important factors together in one program. First, society is more and more concerned with the postsecondary education of all Americans and not, as formerly, with just those who are following traditional college programs. Second, measurement technology has advanced to the stage where not only can career-related scales be well-constructed and combined in ways to promote student exploration of many career areas, but also students and occupational clusters can be described in comparable ways to help students make sense of the thousands of different careers available. Finally, we know more about the relationship of human characteristics to career development. This Handbook brings together our research on these issues, particularly as they relate to career guidance.

The Handbook was prepared by the staff of the ACT Research and Development Division under the general direction of Leo A. Munday. Dale J. Prediger served as the leader of the extensive project, and chapters or parts of chapters were prepared by John D. Roth (rationale for the Career Planning Program and overview), Gary R. Hanson (construction and content of scales, reliability, interest scale structure), Thomas C. Greenland (norming and norms), Nancy S. Cole (prediction of performance), and Dale J. Prediger (rationale for the Career Planning Profile, norming procedures, differentiation of educational programs). Several technical suggestions were made by Melvin R. Novick. Jeanne C. Davis, Kenneth J. McCaffrey, and Elaine King assisted in editing the manuscript.

This publication joins the *Career Planning Program Student's Booklet* and the *Counselor's Manual* as support to educators using the Career Planning Profile for the career guidance of their students. The ACT Program is pleased to make these available to schools and colleges. We hope that through these publications, and particularly this Handbook, students of all ages and types will be helped in a truly significant way.

Fred F. Harcleroad
President

Iowa City, Iowa
March 1972

TABLE OF CONTENTS

CHAPTER		PAGE
1	**CAREER EDUCATION, CAREER GUIDANCE, AND THE CAREER PLANNING PROGRAM**	1
	The World of Work Tomorrow	1
	The Response of Education	1
	Career Guidance—The Missing Ingredient	3
	Role of Measurement in Guidance	3
	Overview of the Career Planning Program	4
	Career Planning Profile	4
	The Student Report	5
	The *Student's Booklet*	5
	The *Counselor's Manual*	5
	Information Services for Institutions	5
2	**CAREER PLANNING PROFILE CONSTRUCTION, CONTENT, AND NORMING**	9
	A Psychological Framework for the Organization of Occupations and Career-Related Information	9
	Developmental History of the Career Planning Profile	11
	Content of the Career Planning Profile	13
	Student Information Section	13
	Ability Measures	15
	The Vocational Interest Profile	17
	Reading Level of the Career Planning Profile	17
	Norming the Career Planning Profile	18
	Selection of the National Norm Group	18
	Characteristics of the National Norm Group	18
	Characteristics of Norm Group Students	18
	Characteristics of Norm Group Institutions	18
	Scaling the Career Planning Profile Measures	22
	National Norms	22
	Types of Norms	22
	General Norms	23
	Program Cluster Norms	23
	Special Subgroups	23
3	**RELIABILITY AND RELATED CHARACTERISTICS**	25
	Reliability	25
	Ability Measures	26
	Vocational Interest Profile	28
	Career-Related Competencies	29

[continued]

TABLE OF CONTENTS *[continued]*

CHAPTER		PAGE
	Related Characteristics	.29
	Intercorrelations of Career Planning Profile Measures	.30
	Correlations of Ability Measures with Other Measures of Ability	.30
	Spatial Configuration of the Vocational Interest Profile	.32
4	**VALIDITY OF THE CAREER PLANNING PROFILE FOR CAREER GUIDANCE: PREDICTION OF PERFORMANCE**	.35
	Relationship between Ability Scales and Course Performance	.35
	Design of Analyses	.35
	The Career Planning Program Prediction System	.36
	Results	.36
	Prediction of Course Performance	.39
5	**VALIDITY OF THE CAREER PLANNING PROFILE FOR CAREER GUIDANCE: DIFFERENTIATION OF EDUCATIONAL PROGRAMS**	.41
	Program Cluster Differences on Self-Report Scales	.41
	Educational Program Differences on Selected Scales	.43
	Design of Analyses	.46
	Differences in Same Program across Institutions	.47
	Differences across Educational Program Areas	.49
	Differences across Program Clusters	.58
	Exploration Priorities	.58
	APPENDIXES	.61
	A. General Norms	.63
	B. Program Cluster Norms	.69
	Vocational and Technical Program Clusters	.70
	Trade & Industrial	.70
	Technical–Agriculture Production	.72
	Technical–Engineering Applications	.74
	Health	.76
	Social Science and Public Service	.78
	Business Contact and Marketing	.80
	Business Detail and Office	.82
	Transfer Program Clusters	.84
	Natural Science and Health	.84
	Arts and Humanities	.86
	Social Science and Public Service	.88
	Business Administration	.90
	Student Profile Sheet (Sample for Reproduction)	.92
	C. Special Subgroup Norms	.93
	Age 25 and Older	.94
	Part-Time Students	.98
	Afro-American/Black	102
	Mexican-Spanish/American	106
	D. Institutions Administering the Career Planning Profile during the National Norming Period	110
	REFERENCES	113

LIST OF TABLES

TABLE		PAGE
2.1	Classifications of Occupations and Vocational Interests	.10
2.2	Career Clusters Used in the Career Planning Program	.12
2.3	Representative Items for Each Vocational Interest Profile Scale	.17
2.4	Reading Level for Form G	.18
2.5	Geographic Distribution of Norm Group Members and Institutions	.19
2.6	Percentage of Norm Group Enrollment in Career Education Clusters by Region	.19
2.7	Distribution of Parents' Educational Levels	.20
2.8	Distribution of Parents' Occupations	.20
2.9	Distribution of Ethnic Background	.20
2.10	Distribution of Family Income	.20
2.11	Age Distribution	.21
2.12	Enrollment Status	.21
2.13	Distribution of Letter Grades for Six Subject Areas	.21
3.1	A Comparison of the Career Planning Profile General Norm Group with Sample A and Sample B	.25
3.2	Degree of Speededness of Form F Ability Measures	.26
3.3	Time Limit and Item Number Changes in the Ability Measures from Form F to Form G	.26
3.4	Frequency Distributions of Item Difficulties on Form F Ability Measures	.26
3.5	Frequency Distributions for Point-Biserial Correlations of Individual Items with Total Scale Scores on Form F Ability Measures	.27
3.6	Kuder-Richardson Formula 20 Estimates of Reliability for Five Ability Measures	.27
3.7	Test-Retest Correlations over a 60-Day Interval for Three Ability Measures	.27
3.8	Coefficient Alpha Estimates of Reliability for Eight Vocational Interest Profile Scales	.28
3.9	Test-Retest Correlations for Eight Vocational Interest Profile Scales for over a 60-Day Interval	.28
3.10	Kuder-Richardson Formula 20 Estimates of Reliability for Eight Form F Career-Related Competency Scales	.29
3.11	Test-Retest Reliabilities for Eight Form F Career-Related Competency Scales	.29
3.12	Intercorrelations for Vocational Interest Profile Scales, Ability Measures, and Career-Related Competency Scales	.31
3.13	Correlation of Ability Measures with General Aptitude Test Battery Measures	.32
3.14	Correlations of Ability Measures with Tests from the ACT Assessment	.32
4.1	Correlations of Career Planning Profile Ability Measures with First-Term Grades	.37

[continued]

LIST OF TABLES *[continued]*

TABLE		PAGE
4.2	Multiple Correlations of Selected Career Planning Profile Predictors with Grades	.38
4.3	Generalized Regression Coefficients for CPP Predictions of GPA by Educational Program	.39
4.4	Regression Weights for Least-Squares and for Bayesian Values for the Data Processing Program	.40
5.1	Differences on Self-Estimates of Mechanical Ability for Men Grouped by Program Cluster (Example of Contingency Table)	.43
5.2	Differences on Single-Item Self-Report Scales for Students Grouped by Program Cluster: Men	.44
5.3	Differences on Single-Item Self-Report Scales for Students Grouped by Program Cluster: Women	.45
5.4	Set 1 and Set 1a Measures Used in Discriminant Analyses	.47
5.5	Number of Students and Institutions Involved in Discriminant Analyses across Educational Program Areas	.49
5.6	Examples of Educational Programs in Areas Combining Several Educational Programs	.50
5.7	Summary of Discriminant Analysis Search for Institutional Differences within Educational Program Areas	.51
5.8	Contribution of Set 1 Variables to Differentiation of Educational Program Areas	.56
5.9	Contribution of Set 2 Variables to Differentiation of Educational Program Areas	.57

LIST OF FIGURES

FIGURE		PAGE
1.1	The Changing World of Work as Projected by the U.S. Department of Labor	2
1.2	Facsimile of the Front of the Career Planning Profile Student Report (1972 Form)	6
1.3	Facsimile of the Opened Flap of the Career Planning Profile Student Report (1972 Form)	7
2.1	Circular Ordering of Holland's Categories and the Corresponding Ordering of the Categories of Roe	11
2.2	Circular Configuration of Career-Related Characteristics and Occupations Used in Development of the Career Planning Profile	11
3.1	Spatial Configuration of Vocational Interest Profile Scales and Means of Program Clusters for Men	33
3.2	Spatial Configuration of Vocational Interest Profile Scales and Means of Program Clusters for Women	34
5.1	Differences in Profile Medians for Men Enroiled in Selected Program Clusters	42
5.2	Design for Discriminant Analyses Conducted across Programs	46
5.3	Institutional Differences on First Two Ability and Interest Factors for Women Enrolled in Registered Nursing Programs	48
5.4	Distribution of Educational Program Areas on First Two Discriminant Factors for Set 1a Measures (Men)	52
5.5	Distribution of Educational Program Areas on First Two Discriminant Factors for Set 1a Measures (Women)	53
5.6	Distribution of Educational Program Areas on First Two Discriminant Factors for Set 2 Measures (Men)	54
5.7	Distribution of Educational Program Areas on First Two Discriminant Factors for Set 2 Measures (Women)	55

CHAPTER 1

CAREER EDUCATION, CAREER GUIDANCE, AND THE CAREER PLANNING PROGRAM

Institutions providing career education in America today are faced with the responsibility of assisting students in the transition to post-high school education and to the world of work. Recognition of the importance of career education in our society has been accompanied by a dramatic increase in the number of students seeking career education programs. All too often, counselors have been unprepared to serve these students fully because of gaps in their professional preparation and the lack of appropriate guidance tools. As a result, there is an urgent need for a comprehensive guidance program to assist students with career planning—that is, planning their educational and vocational futures. It is in direct response to this need that the Career Planning Program was developed.

Briefly, the Career Planning Program is a guidance-oriented system for collecting, integrating, and reporting information relevant to career planning on the part of students and to administrative planning on the part of participating institutions. In a comprehensive report to the student and his counselor, the background, interests, abilities, preferences, and goals of the student are related to educational programs and occupations, thus providing information useful in educational and vocational planning. Institutions receive copies of the Student Report along with a report summarizing the characteristics, plans, and needs of their prospective students as a group. Institutions also have the opportunity to participate in follow-up services designed to provide additional information for program development, administrative planning, and evaluation.

The rationale underlying the Career Planning Program reflects several current developments in American society and American education. Among these are the changing nature of the world of work, the response of our educational system to this change, and the increasing significance of career guidance. Each of these developments is briefly reviewed in the following pages.

The World of Work Tomorrow

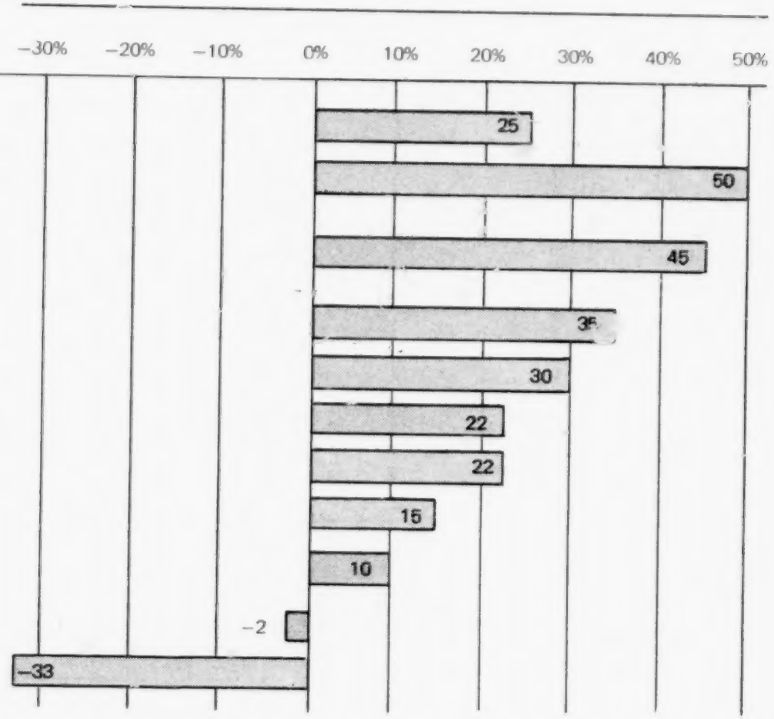
Expected growth rates for occupational groups are key indicators of the future job outlook. The importance of education for jobs of the future is underscored by manpower needs projected by the U.S. Department of Labor (1970b). The bar graph in Figure 1.1 points out the continuing trend toward white-collar and service occupations, led by growth in the numbers of professional-technical workers, service workers, and clerical workers. When replacement needs are combined with anticipated growth, openings for workers in the clerical groups will account for almost one-fourth of the approximately four million workers needed annually in this country. About one of five workers will find jobs in the professional-technical category, with an additional 16% of the openings being in service occupations. Managers, craft workers, and operatives will each account for about 10% of the annual openings for workers anticipated over the remainder of the present decade (U.S. Department of Labor, 1971).

The addition of information about the educational level of workers in each of these categories helps to complete the picture of the future job market. In general, employment growth will be fastest in those occupations requiring the most education and training. For example, employees in professional-technical occupations had the highest level of education in 1968 and this is the occupational group which will experience the fastest growth through the 1970s. Occupations for which employees had a median education of less than 11th grade in 1968 will account for only about 5% of the available openings for workers each year. The rising levels of skill associated with changes in the occupational structure place increasing emphasis on the role of the post-high school educational program in the career development of American youth. In the future, an appropriate program of education at the post-high school level may well be the key to stable employment, much as the high school diploma has been in past decades.

The Response of Education

As changes in our occupational structure increase the needs for career training and retraining, greater numbers of students are entering vocational-technical institutes, area vocational-technical schools, and community/junior colleges—institutions in the mainstream of America's career education efforts. At present there are more than 700 vocational-technical schools and institutes offering postsecondary education in the United States (U.S. Office of Education, 1971), with an additional 1,100 community and junior colleges serving students seeking postsecondary education (American Association of Junior Colleges, 1971). The community and junior colleges alone enrolled 2.5 million students for the 1970-71 school year, four times the number of students attending this type of institution 10 years ago. Accompanying this increase in number of students are increases in the number and range of programs being offered. A recent survey (American Association of Junior Colleges, 1970) of 975 community and junior colleges indicates that they collectively offer more than 16,700 career education programs with job entry, certificate, or Associate Degree objectives. An additional 4,000 programs are being planned.

School years completed (median, 1968)	Workers needed annually 1968-1980		Occupational group
	Number of workers	Percentage of total	
	3,991,000	100.0	ALL OCCUPATIONS
16.3	777,000	19.5	Professional and technical workers
11.6	631,000	15.8	Service workers, except private household, e.g., hospital attendants, policemen, waitresses
12.6	912,000	22.9	Clerical workers
12.6	263,000	6.6	Sales workers
12.7	380,000	9.5	Managers, officials, proprietors
12.0	396,000	9.9	Craftsmen and foremen
8.8	121,000	3.0	Private household workers
11.0	426,000	10.7	Operatives, e.g., assemblers, truck drivers, bus drivers
9.8	60,000	1.5	Nonfarm laborers
9.1	25,000	0.6	Farm workers



NOTE.—Taken from U.S. Department of Labor publications (1970a, 1970b, 1971).

Fig. 1.1. The changing world of work as projected by the U.S. Department of Labor.

The most consistent aspect of the new career education programs is their diversity—diversity not only in the nature of the programs offered but also in the students enrolled. The entrants into postsecondary education are increasingly heterogeneous. Their talents, skills, and experiences are diverse; their interests, purposes, and aspirations are diverse; and the educational programs and fields in which they are preparing are diverse. The challenge to institutions is to help students understand themselves in the context of this diversity and to assist them in the identification and pursuit of appropriate educational objectives.

Career Guidance—The Missing Ingredient

The changing world of work and the growing opportunities existing within our educational system present an unintelligible smorgasbord of choices for many students struggling with career decision. Assisting the student to gather information with the purpose of choosing wisely among alternatives has long been one of the central concepts in the guidance movement. In the past, however, the practice of guidance has suffered from several inadequacies. Too frequently, "career" guidance has been focused on a limited number of students with emphasis on the selection of a college. Paths to careers have been viewed in terms of dual educational avenues—the "high road" leading to academic education and the "low road" to career education. Finally, career guidance has too often been based on the concept of vocational choice as a matching process—square pegs in square holes—occurring at a single point in an individual's life.

Recently, a restructuring of career guidance philosophy and practice has been occurring as an outgrowth of vocational development theory and research. Attention is being focused on work as one of the central experiences of Man—as the making of a life as well as the making of a living. Greater emphasis is being placed on career development and decision making as a continuous process. In this framework, a career is viewed as a lifelong series of experiences and decisions, with each experience and decision having implications for those which follow. Thus, developmental career guidance programs seek to assist the individual in the continuous process of discovering his own uniqueness and relating his "self" to future educational and vocational roles. Career information, information about personal characteristics, and direct or simulated career-related experiences represent key components in this process.

While educators and counselors have differed with respect to the emphasis placed on the various aspects of career guidance, a number of common dimensions and purposes are present. Of major importance is the assumption that guidance is consonant with our democratic philosophy of education. That is, natural differences are deliberately identified and developed in the belief that our nation is strengthened through diversity of interests and talents. A second assumption is that education, broadly defined, exists to expand both the number and variety of opportunities from which individuals may choose. Guidance exists to help individuals choose from all possible alternatives available to them. This is done by encouraging the individual to learn, think, and make decisions about himself and his opportunities. Still another important assumption is that persons whom counselors serve will, if given the necessary resources, practice, and encouragement, make more satisfying educational and vocational decisions. A prime purpose of both education and guidance, then, is to provide the opportunities, the means, and the motivation that will assist Man to be free—free to choose and control his own destiny.

The renewed interest in career guidance in America is nowhere more evident than in the career education models being developed for the nation's schools by the U.S. Office of Education. The emphasis in these models is on relating the educational curriculum to careers during the entire educational experience of the student. In the words of U.S. Commissioner of Education Dr. Sidney P. Marland, Jr., career education programs should be designed to "expose the student to the range of career opportunities, help him narrow down the choices in terms of his own aptitudes and interests, and provide him with education and training appropriate to his ambition" (Marland on Career Education, 1971). Thus, from the career education point of view, career guidance and education are a continuous part of the curriculum for every student, with the goal that each student leaving the educational system will possess the self-understanding and the skills necessary for securing both a livelihood and a rewarding life.

Role of Measurement in Guidance

Measurement activities have long played a major role in counseling and guidance. Major approaches to the use of measurement in guidance are illustrated quite well by the concept of "bandwidth," first introduced to the testing literature by Cronbach and Gleser (1957). In the Cronbach-Gleser analogy, narrow bandwidth measurement concentrates on a narrow range of information relevant to specific decisions. For example, a mathematics placement test may be useful for selecting and placing students within a mathematics program without providing information for English placement or career guidance in general. Industry and the armed forces have long used narrowband instruments for selection and placement.

In contrast, wide bandwidth measurement instruments transmit information related to a broad range of concerns, with less "fidelity" with respect to any one given concern. Thus, a "wideband instrument" may have mathematics and English tests, but it will also cover other abilities and perhaps other student characteristics such as interests, aspirations, and values. The time devoted to the measurement of any one of these characteristics will be limited, however. In the context of career guidance, wideband measurement devices are especially useful in facilitating educational and vocational exploration. This is usually accomplished by suggesting educational and vocational possibilities to students and helping them assess the likelihood that they can transform these possibilities into realities. When supported by an ongoing guidance program, the wideband approach de-emphasizes the use of test scores as last-minute decision makers and avoids the traditional "test-em and tell-em" syndrome.

Of course, bandwidth in a measurement device is a matter of degree. The Career Planning Program emphasizes the wideband approach to measurement while retaining scales which are also useful in educational placement. The goal is to provide, in one program, comprehensive information useful both in career guidance and administrative planning.

Overview of the Career Planning Program

The basic rationale of the Career Planning Program flows directly from the view that the process of planning is crucial for the individual who wishes to exercise control over the direction of his career. Career planning requires that the individual become aware of his personal likes and dislikes, skills, and values, along with the constraints and opportunities presented by environment. In addition, he must organize this information in a way that is relevant to career planning.

The Career Planning Program has several unique characteristics which make it especially appropriate for use by the young person in the process of career planning:

- The Career Planning Program "puts it all together." Under a single cover for the first time is a guidance instrument that relates interests, aspirations, abilities, job values, competencies, and past experiences to career planning.

- The Career Planning Program translates test data into useful information. A major emphasis of the program is placed on communication of meaningful information, not just scores.

- The Career Planning Program serves *both students and institutions.* It serves students by collecting, integrating, and reporting information relevant to career exploration and planning. Simultaneously, it serves institutions by providing them with information about their students individually and collectively. The information about students as individuals can be used to help students translate their potentials and aspirations into career plans and accomplishments. The information about students, collectively, can be used in planning and evaluating educational programs and special services.

- The Career Planning Program includes a *Student's Booklet* that relates basic concepts of career development, career planning, and decision making to the information provided on the Student Report. The booklet also explains and interrelates the Student Report sections and offers concrete leads to career exploration activities. Included are descriptions of 22 career education programs and references to occupational information for 106 vocations.

- The Career Planning Program is a guidance information system. The initial assessment occurs as a student prepares to enter post-high school education. Follow-up assessments of student reactions and progress may be administered after the first term of enrollment and again after the student has entered his first job. Each of the three assessments is accompanied by analysis services which summarize and integrate information from the assessments so that this information may be used in the guidance of future students.

Career Planning Profile

The Career Planning Profile represents the point of entry into the Career Planning Program information system. Typically completed by students during the final year of high school, the instrument includes a Vocational Interest Profile, Ability Measures, and a Student Information Section.

Vocational Interest Profile. The Vocational Interest Profile consists of an inventory of student preferences for activities related to basic types of vocational interests. Responses are organized into eight scales: *Science, Health, Arts, Social Service, Business Contact, Business Detail, Trades,* and *Technical.*

Ability Measures. The eight Ability Measures in the Career Planning Profile were developed to assess student abilities which research suggests are important to success in a wide variety of educational programs and to success on various types of jobs. A number of career education programs require various types of academic abilities for successful completion. Accordingly, three scales were developed to measure these abilities:

- Reading Skills
- Mathematical Usage
- Language Usage.

Many students wish to pursue courses and occupations that also require other, equally important, abilities. The following five scales were developed to assess these special abilities:

- Mechanical Reasoning
- Clerical Skills
- Space Relations
- Numerical Computation
- Nonverbal Reasoning.

Student Information Section. The primary purpose of this section is to help the student explore and describe a number of factors about himself which are relevant to career decisions and educational planning. Portions of the Student Information Section may be considered to be a structured interview which serves to stimulate students to think about themselves in career-related terms and to organize and examine their career-related feelings and perceptions. Information provided by the Student Information Section can readily serve as a point of departure for exploration during counseling interviews. The Student Information Section will also be useful in identifying students with special needs and for planning institutional programs and services.

There are five areas of information summarized by the Student Information Section:

- Educational and Vocational Plans—educational aspirations; proposed educational program; vocational choices; housing, work and extracurricular plans; institutional choices.

- Student Concerns—student's request for help in obtaining financial assistance; in finding a part-time job, housing, or child care facilities; in improving reading, writing, math, and study skills; in coping with health problems; and in choosing a field of study.

- Work Orientation—job values, working condition preferences.

- Career-Related Competencies—competencies developed through school, leisure, and work experiences.

- Biographical Information—birth date, sex, racial/ethnic background (optional), educational status, parental education and occupation.

The Student Report

The value of a measurement system is very closely tied to how successfully these measures are communicated to users. The Career Planning Profile Student Report has been developed to assist the student and his counselor in focusing relevant information on the task of career planning. Figure 1.2 is a facsimile of the front of the Career Planning Profile Student Report (1972 Form), and provides an overview of the information summarized for the student and his designated institutions. The Student Report is shown as received by the student, with a 3-inch flap folded closed at the right. The exposed side of the flap introduces the student to several concepts of career planning and draws his attention to the Career Clusters and the Educational Planning Summary on the front of the Student Report.

In many ways, the Career Clusters section represents the heart of the Student Report. In it, the interests, competencies, and abilities of the student are summarized in a framework subsuming psychologically related occupations and educational programs. The six clusters of Science, Arts, Social Service, Business Contact, Business Detail, and Trades have direct relationships to the six vocational interest types and environments which Holland (1966) has theoretically proposed and which have been substantiated in a number of research studies (see Chapter 2). Two additional clusters, Technical and Health, were formed to reflect career programs which make up a significant portion of the offerings in vocational-technical institutions and community colleges.

The Educational Planning Summary provides exploration priority information and course performance estimates based on the characteristics and experiences of earlier students in 22 of the more prevalent post-high school educational programs. Exploration priority information is developed by comparing the student's interests, competencies, and working condition preferences with those of students enrolled in the specific programs. An asterisk (*) in the Exploration Priority column marks a program suggested for exploration, with a double asterisk(**) suggesting high priority for exploration. Course performance estimates, based on ability measures and in some cases past grades, are provided for specific programs at up to two institutions of the student's choice and for a group of institutions selected from a nationwide sample. General Studies (Core) course estimates are provided for the basic courses often required of all vocational and technical students. (See Chapters 4 and 5 for discussion of the development of course performance estimates and exploration priority indices.)

A summary of the student's background and educational plans, his career preferences, and additional career-related characteristics is presented beneath the flap of the Student Report, as shown in Figure 1.3. This information is especially useful for career exploration in the counseling interview and for communicating the plans and needs of the student to his prospective institutions.

The *Student's Booklet*

The Career Planning Profile Student Report is accompanied by a booklet for each student designed to assist with career planning. Using illustrations and a conversational style, the *Student's Booklet* emphasizes the application of basic career development and decision-making concepts in career planning and the selection of an educational program. A fictitious student in the process of considering the meaning of his Student Report is used to illustrate the interpretation of information on the report.

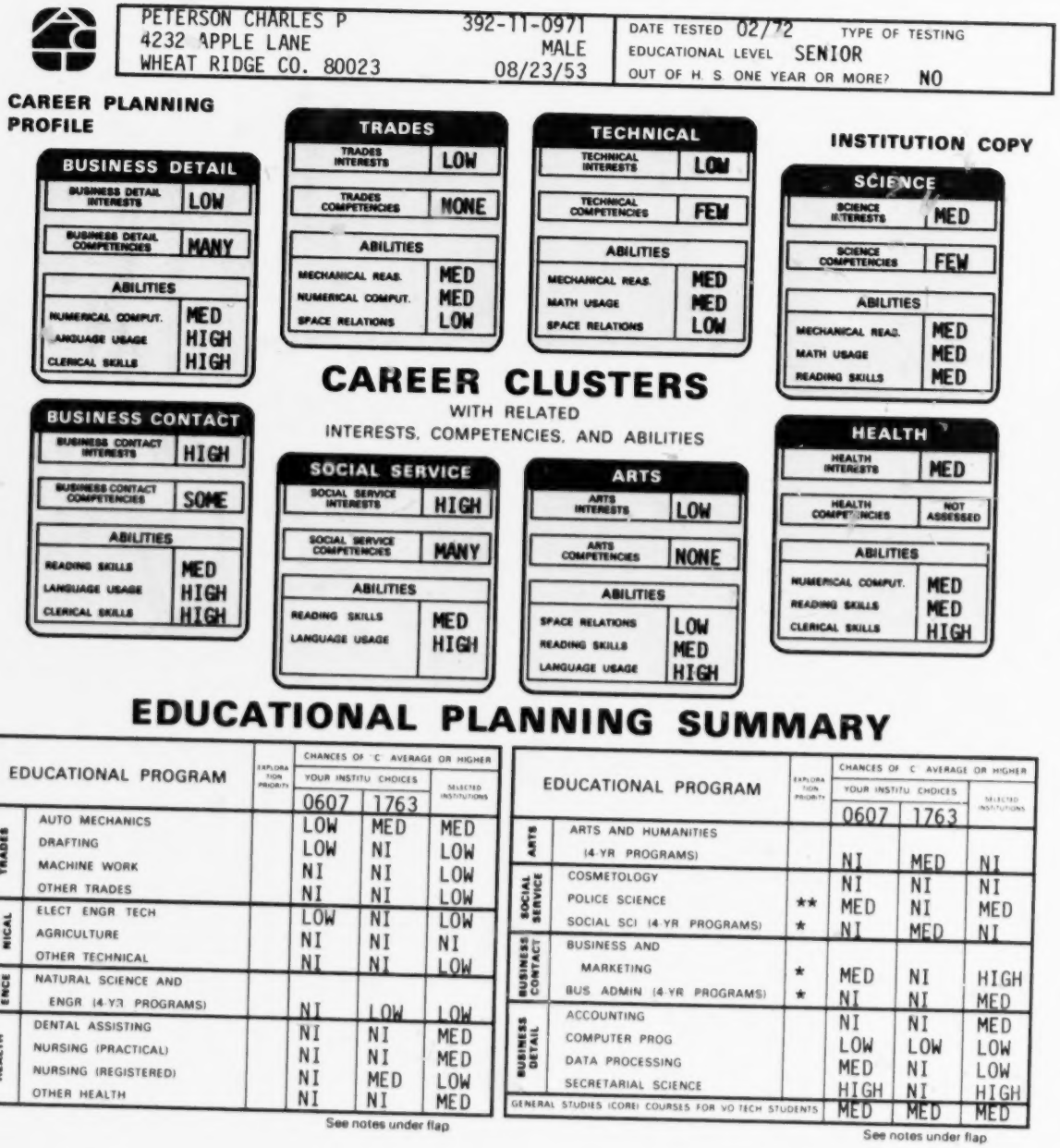
Another section of the *Student's Booklet* provides descriptive information about specific educational programs with references to additional sources of occupational information. Each of the 22 programs included in the Educational Planning Summary on the Student Report is described, including the nature of the program, recommended preparation, and related jobs. In addition, the booklet contains a comprehensive list of 106 educational programs and occupations organized according to the Career Clusters reported on the Student Report. Page references for related occupational information found in publications such as the *Occupational Outlook Handbook* are provided to assist the student in going from his report to further information about job families and specific occupations.

The *Counselor's Manual*

The counselor's role in career guidance is a vital one. The primary purpose of the *Counselor's Manual* is to place Career Planning Profile information in a career development context and to suggest ways in which this information can be used in counseling, guidance, and placement. A number of questions concerning the administrative and operational aspects of the Career Planning Program are also answered.

Information Services for Institutions

The Career Planning Profile Student Report is routinely sent to the student's high school (with a copy for the student). An appropriately edited version is sent to each postsecondary institution designated by the student. In addition, institutions may participate in three Career Planning Program information services. The first service is the *Profile of Career Applicants*, a summary report provided as a free-of-charge research service. These reports are automatically sent in the fall of the year to



PETERSON CHARLES P
4232 APPLE LANE
WHEAT RIDGE CO. 80023

392-11-0971
MALE
08/23/53

DATE TESTED 02/72 TYPE OF TESTING
EDUCATIONAL LEVEL SENIOR
OUT OF H. S. ONE YEAR OR MORE? NO

CAREER PLANNING PROFILE

INSTITUTION COPY

BUSINESS DETAIL
BUSINESS DETAIL INTERESTS: LOW
BUSINESS DETAIL COMPETENCIES: MANY
ABILITIES
NUMERICAL COMPUT.: MED
LANGUAGE USAGE: HIGH
CLERICAL SKILLS: HIGH

TRADES
TRADES INTERESTS: LOW
TRADES COMPETENCIES: NONE
ABILITIES
MECHANICAL REAS.: MED
NUMERICAL COMPUT.: MED
SPACE RELATIONS: LOW

TECHNICAL
TECHNICAL INTERESTS: LOW
TECHNICAL COMPETENCIES: FEW
ABILITIES
MECHANICAL REAS.: MED
MATH USAGE: MED
SPACE RELATIONS: LOW

SCIENCE
SCIENCE INTERESTS: MED
SCIENCE COMPETENCIES: FEW
ABILITIES
MECHANICAL REAS.: MED
MATH USAGE: MED
READING SKILLS: MED

CAREER CLUSTERS
WITH RELATED
INTERESTS, COMPETENCIES, AND ABILITIES

BUSINESS CONTACT
BUSINESS CONTACT INTERESTS: HIGH
BUSINESS CONTACT COMPETENCIES: SOME
ABILITIES
READING SKILLS: MED
LANGUAGE USAGE: HIGH
CLERICAL SKILLS: HIGH

SOCIAL SERVICE
SOCIAL SERVICE INTERESTS: HIGH
SOCIAL SERVICE COMPETENCIES: MANY
ABILITIES
READING SKILLS: MED
LANGUAGE USAGE: HIGH

ARTS
ARTS INTERESTS: LOW
ARTS COMPETENCIES: NONE
ABILITIES
SPACE RELATIONS: LOW
READING SKILLS: MED
LANGUAGE USAGE: HIGH

HEALTH
HEALTH INTERESTS: MED
HEALTH COMPETENCIES: NOT ASSESSED
ABILITIES
NUMERICAL COMPUT.: MED
READING SKILLS: MED
CLERICAL SKILLS: HIGH

EDUCATIONAL PLANNING SUMMARY

	EDUCATIONAL PROGRAM	EXPLORATION PRIORITY	CHANCES OF "C" AVERAGE OR HIGHER: YOUR INSTITU CHOICES 0607	YOUR INSTITU CHOICES 1763	SELECTED INSTITUTIONS
TRADES	AUTO MECHANICS		LOW	MED	MED
	DRAFTING		LOW	NI	LOW
	MACHINE WORK		NI	NI	LOW
	OTHER TRADES		NI	NI	LOW
TECHNICAL	ELECT ENGR TECH		LOW	NI	LOW
	AGRICULTURE		NI	NI	NI
	OTHER TECHNICAL		NI	NI	LOW
SCIENCE	NATURAL SCIENCE AND ENGR (4-YR PROGRAMS)		NI	LOW	LOW
HEALTH	DENTAL ASSISTING		NI	NI	MED
	NURSING (PRACTICAL)		NI	NI	MED
	NURSING (REGISTERED)		NI	MED	LOW
	OTHER HEALTH		NI	NI	MED

See notes under flap

	EDUCATIONAL PROGRAM	EXPLORATION PRIORITY	CHANCES OF "C" AVERAGE OR HIGHER: YOUR INSTITU CHOICES 0607	YOUR INSTITU CHOICES 1763	SELECTED INSTITUTIONS
ARTS	ARTS AND HUMANITIES (4-YR PROGRAMS)		NI	MED	NI
SOCIAL SERVICE	COSMETOLOGY		NI	NI	NI
	POLICE SCIENCE	**	MED	NI	MED
	SOCIAL SCI (4-YR PROGRAMS)	*	NI	MED	NI
BUSINESS CONTACT	BUSINESS AND MARKETING	*	MED	NI	HIGH
	BUS ADMIN (4-YR PROGRAMS)	*	NI	NI	MED
BUSINESS DETAIL	ACCOUNTING		NI	NI	MED
	COMPUTER PROG		LOW	LOW	LOW
	DATA PROCESSING		MED	NI	LOW
	SECRETARIAL SCIENCE		HIGH	NI	HIGH
GENERAL STUDIES (CORE) COURSES FOR VO TECH STUDENTS			MED	MED	MED

See notes under flap

CAREER PLANNING PROFILE

CAREER PLANNING—EVERYONE'S JOB

We all make career decisions — decisions affecting our educational and job futures. Sometimes we make these decisions by default because of what we didn't know or didn't do. Sometimes we are able to take charge, to discover our possibilities and weigh our choices. This report is designed to help YOU take charge. It doesn't tell you all you need to know to plan your future, but it does provide information others have found useful in career planning. And most important, it may suggest some possibilities, some avenues to the future, that you might have missed otherwise.

Use of your report is discussed in the accompanying Student's Booklet. Be sure you get one! A brief description of the four main parts of the report follows:

- CAREER CLUSTERS. To the left you will find eight boxes representing career clusters that cover most of the occupations and educational programs which people enter. Your interest, competency, and ability scores have been grouped into the clusters for which they are most relevant. Interest and ability scores are summarized as HIGH, MED (medium), or LOW and the number of competencies you reported as NONE, FEW, SOME, and MANY.

- EDUCATIONAL PLANNING SUMMARY. At the bottom left, a number of educational programs offered in community colleges and other post-high school institutions are listed. For each program, two kinds of information are provided:

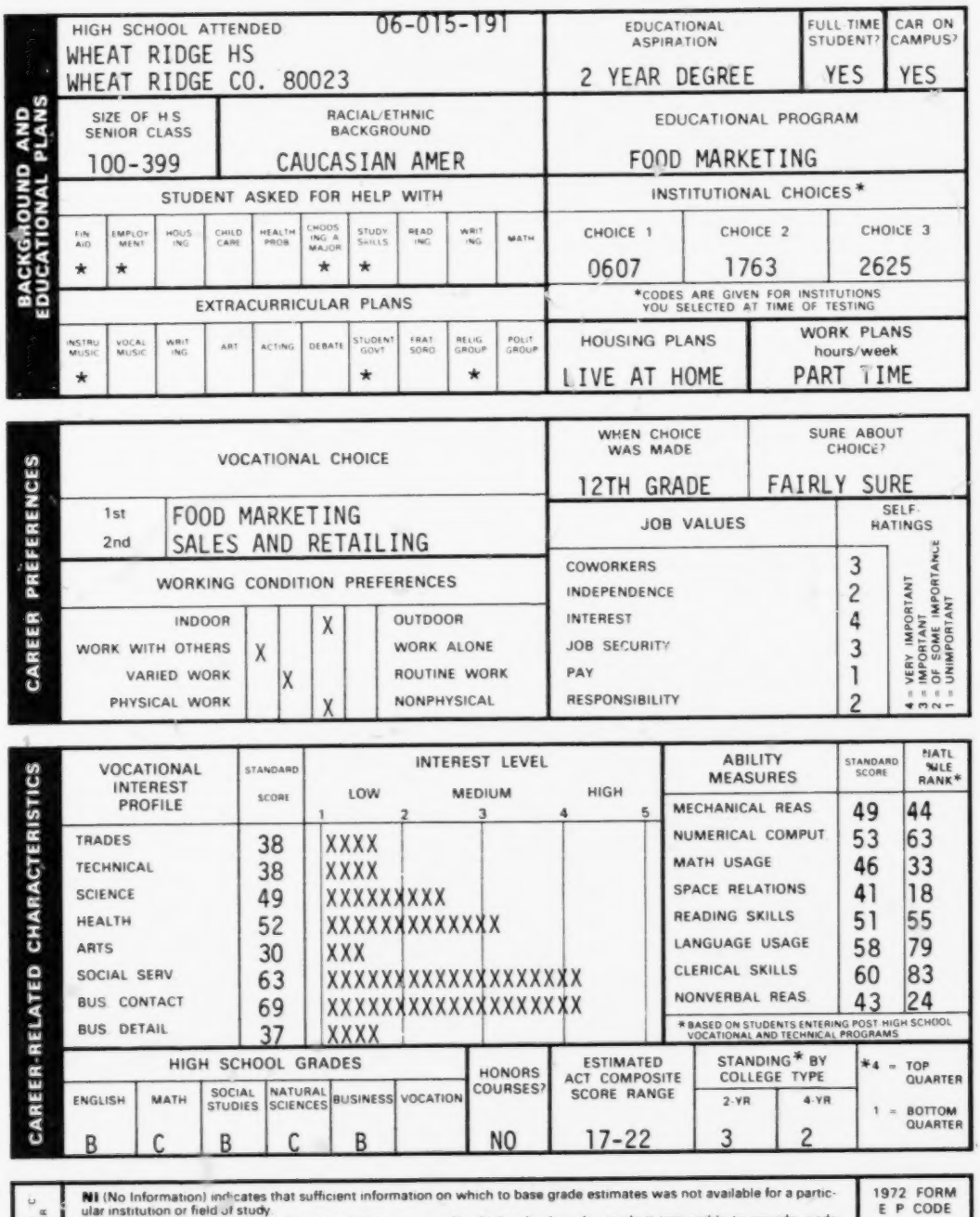
  EXPLORATION PRIORITY. An asterisk (*) in this column indicates programs enrolling successful and satisfied students with interests, competencies, and working condition preferences similar to yours. You may want to give priority to *exploring* — looking into — these programs. High priority is suggested by * *.

  CHANCES OF "C" AVERAGE OR HIGHER. Course performance estimates based on your ability scores and in some cases, past grades, are provided for up to two of your institutional choices for which sufficient information was available. Your first choice may or may not be included. General estimates are also provided for a group of *selected institutions* obtained from a nationwide sample. Your estimated chances in 10 of a "C" average or higher are coded as follows: HIGH = 7 or more, MED (medium) = 4-6, LOW = 3 or less.

- UNDER THIS FLAP you will find information on your educational background and plans, career preferences, and career-related characteristics for use primarily by your counselor.

- ON THE BACK OF THIS REPORT you are given the opportunity to relate your own estimates of your abilities to the eight career clusters.

Fig. 1.2. Facsimile of the front of the Career Planning Profile Student Report (1972 Form).



BACKGROUND AND EDUCATIONAL PLANS

HIGH SCHOOL ATTENDED: 06-015-191
WHEAT RIDGE HS
WHEAT RIDGE CO. 80023

EDUCATIONAL ASPIRATION: 2 YEAR DEGREE
FULL TIME STUDENT?: YES
CAR ON CAMPUS?: YES

SIZE OF H S SENIOR CLASS: 100-399
RACIAL/ETHNIC BACKGROUND: CAUCASIAN AMER
EDUCATIONAL PROGRAM: FOOD MARKETING

STUDENT ASKED FOR HELP WITH

FIN AID	EMPLOY MENT	HOUS ING	CHILD CARE	HEALTH PROB	CHOOS ING A MAJOR	STUDY SKILLS	READ ING	WRIT ING	MATH
★	★				★	★			

INSTITUTIONAL CHOICES*

CHOICE 1	CHOICE 2	CHOICE 3
0607	1763	2625

*CODES ARE GIVEN FOR INSTITUTIONS YOU SELECTED AT TIME OF TESTING

EXTRACURRICULAR PLANS

INSTRU MUSIC	VOCAL MUSIC	WRIT ING	ART	ACTING	DEBATE	STUDENT GOVT	FRAT SORO	RELIG GROUP	POLIT GROUP
★						★		★	

HOUSING PLANS: LIVE AT HOME
WORK PLANS hours/week: PART TIME

CAREER PREFERENCES

VOCATIONAL CHOICE

WHEN CHOICE WAS MADE: 12TH GRADE
SURE ABOUT CHOICE?: FAIRLY SURE

1st: FOOD MARKETING
2nd: SALES AND RETAILING

WORKING CONDITION PREFERENCES

INDOOR			X		OUTDOOR
WORK WITH OTHERS	X				WORK ALONE
VARIED WORK		X			ROUTINE WORK
PHYSICAL WORK			X		NONPHYSICAL

JOB VALUES / SELF-RATINGS

COWORKERS	3
INDEPENDENCE	2
INTEREST	4
JOB SECURITY	3
PAY	1
RESPONSIBILITY	2

4 = VERY IMPORTANT
3 = IMPORTANT
2 = OF SOME IMPORTANCE
1 = UNIMPORTANT

CAREER-RELATED CHARACTERISTICS

VOCATIONAL INTEREST PROFILE	STANDARD SCORE	INTEREST LEVEL (LOW 1 2 / MEDIUM 3 / HIGH 4 5)
TRADES	38	XXXX
TECHNICAL	38	XXXX
SCIENCE	49	XXXXXXXXX
HEALTH	52	XXXXXXXXXXXX
ARTS	30	XXX
SOCIAL SERV	63	XXXXXXXXXXXXXXXXXX
BUS CONTACT	69	XXXXXXXXXXXXXXXXXX
BUS DETAIL	37	XXXX

ABILITY MEASURES	STANDARD SCORE	NATL %ILE RANK*
MECHANICAL REAS	49	44
NUMERICAL COMPUT	53	63
MATH USAGE	46	33
SPACE RELATIONS	41	18
READING SKILLS	51	55
LANGUAGE USAGE	58	79
CLERICAL SKILLS	60	83
NONVERBAL REAS	43	24

*BASED ON STUDENTS ENTERING POST HIGH SCHOOL VOCATIONAL AND TECHNICAL PROGRAMS

HIGH SCHOOL GRADES

ENGLISH	MATH	SOCIAL STUDIES	NATURAL SCIENCES	BUSINESS	VOCATION
B	C	B	C	B	

HONORS COURSES?: NO

ESTIMATED ACT COMPOSITE SCORE RANGE: 17-22

STANDING* BY COLLEGE TYPE

2-YR	4-YR
3	2

*4 = TOP QUARTER
1 = BOTTOM QUARTER

CHANCES OF C OR HIGHER

NI (No Information) indicates that sufficient information on which to base grade estimates was not available for a particular institution or field of study.
Blanks indicate that absence of certain ability scores and/or high school grades made it impossible to provide grade estimates.
Caution: When a student is unlike other students entering an educational program, grade estimates for that program should be used with caution. For example, care should be used in interpreting grade estimates for a student of one sex in a program in which the other sex predominates.

1972 FORM E P CODE

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Fig. 1.3. Facsimile of the opened flap of the Career Planning Profile Student Report (1972 Form).

all post-high school institutions which have received a Student Report for 25 or more students during the test year. The *Profile of Career Applicants* report includes:

1. Local norms
   - Distributions of scores made by applicants on the various Career Planning Profile ability, interest, and career-related competency scales
   - Distributions of high school grades in six subject areas
   - Distributions of job values and working condition preferences
2. Summary of student characteristics by program areas
   - Means and standard deviations for Career Planning Profile measures by planned educational program of applicants
   - Means and standard deviations for Career Planning Profile measures by vocational choice of applicants
3. Student background information summary including distributions of family income and parents' occupation and education.

Accompanying this report is a booklet, *Your Career Applicants,* with suggestions on how to interpret and use the information.

A second research service, the *Career Planning Analysis Service,* focuses on the experiences and reactions of the student who is in the midst of a post-high school program. The key instrument in this information service is the Student Follow-up Questionnaire. This instrument is made available at no charge to institutions that have received a *Profile of Career Applicants,* and is appropriate for administration to first-year students at the end of the first term. This brief questionnaire provides a convenient way to obtain and summarize student reactions to institutional programs, services, and facilities, including responses to a maximum of 10 questions developed locally. Students are also given an opportunity to reassess and specify their current vocational and educational plans. Finally, the institution has the option of reporting the level of performance in vocational, technical, and academic coursework for each student.

Data from the Career Planning Profile, the Student Follow-up Questionnaire, and the course performance reports are integrated, analyzed, and returned to the institution at no charge in the form of a summary called the *Career Planning Analysis Report.* This summary not only describes an institution's students after they have accumulated a backlog of experience in their educational programs, but also relates the antecedent Career Planning Profile measures to student progress data obtained from the questionnaire and the course performance report. For example—

- Pre-entry vocational and educational plans are compared with current plans.
- The relationship between Career Planning Profile measures and student performance is summarized.
- Student work plans are compared with hours actually worked.
- Student evaluations of services provided in areas of indicated need are summarized.

Institutions may also identify up to 18 educational programs with sufficient enrollments for which they would like to receive separate analyses.

The third research service available to institutions is the *Postprogram Follow-up Service.* The accountability of an educational institution for the students it produces is a topic which has been receiving considerable attention in recent years. Educators in the fields of vocational and technical education have been among the first to recognize that in-school student performance is but a preliminary to the satisfaction and success students achieve in the world of work. For these reasons, the *Postprogram Follow-up Service* is envisioned as a major component in the Career Planning Program. This service, which is currently under development, is designed to obtain information on the educational history and occupational experience of students within 1 or 2 years after they leave participating institutions. Satisfaction with the student's educational program and the job held at time of follow-up will be key items of information to be obtained.

CHAPTER 2

CAREER PLANNING PROFILE CONSTRUCTION, CONTENT, AND NORMING

An overview and general rationale for the Career Planning Program as a guidance information system was presented in Chapter 1. The focus of the present chapter is on the construction, content, and norming of the Career Planning Profile, the primary instrument of the Career Planning Program. A discussion of the rationale underlying the organization and development of the Career Planning Profile is followed by a developmental history of Career Planning Profile measures. The third section of this chapter outlines the content of the measures, and the final section describes the norming procedures. Comprehensive normative information is presented in the appendixes.

A Psychological Framework for the Organization of Occupations and Career-Related Information

The decision to enter a particular field of work is an ongoing process not limited to any one stage of life. However, at entry into postsecondary education, certain major career decisions are made, even if tentatively. While it is hoped that students will be able to make better decisions as more information is provided to them, mere quantity of information is not sufficient. A method for organizing the many diverse pieces of information related to career decisions is also needed. A conceptual framework for relating a student's abilities, interests, and competencies to groups of related educational programs and occupations offers promise as a useful summarizing tool for the student, and at the same time provides a productive basis for the development of a comprehensive system of guidance information.

Several considerations concerning the organization of vocational interests and the relationships among interests characterizing occupational groups had a major influence on the development of the Career Planning Profile. Among the most important of these considerations was the accumulated evidence suggesting a basic set of vocational interest dimensions that are common to a number of interest inventories. In Table 2.1, like-named interest dimensions suggested by Holland (1966), Roe (1956), and Super (1957) are compared with related occupational interest scales from the Strong Vocational Interest Blank-Basic Scales (SVIB-Basic), the Kuder Occupational Interest Survey (Kuder OIS), and the Minnesota Vocational Interest Inventory (MVII). The six dimensions described by Holland appear to represent the simplest skeletal version of the common aspects of these scales and suggest a conceptual organization of the interest domain which may be useful for students and counselors in the process of vocational exploration.

A second consideration which influenced the development of the Career Planning Profile was the possibility of organizing the interest dimensions mentioned above into a circular arrangement. Roe and Klos (1969) have recently suggested that the interest categories described by Roe (1956) are related to each other in a circular ordering, with categories adjacent in the circle most closely related psychologically. Interest categories most widely separated are the least related. Holland has empirically demonstrated a circular arrangement of the six Vocational Preference Inventory (VPI) scales (Holland, Whitney, Cole, & Richards, 1969). The similarities of the Holland and Roe circular arrangements of interests are apparent in Figure 2.1. In further analysis of this circular structure of interests, Cole and Hanson (1971) identified empirical relationships among the scales within the VPI, the SVIB, the Kuder OIS, and the MVII. Similar configurations of scales were found in each instrument, with each configuration approximating the circular pattern reported by Holland.

A third consideration influencing the development of the Career Planning Profile was research showing that additional career-related characteristics of individuals may also be organized around the basic configuration of interests described above. Holland (1968) found that high points among competency and ability scales are associated with peaks on the related interest dimensions. Using factor analysis and spatial configuration, Edwards and Whitney (1971) found that competencies, self-ratings, activities, and occupations also fit the circular configuration proposed by Holland. In addition, Holland et al. (1970) have demonstrated that occupations can be classified into one of the six categories by using occupational group mean scores on the Vocational Preference Inventory (VPI). Specific vocational choices of students have been empirically related both to each other and to Holland's VPI scales in work by Cole, Whitney, and Holland (1971). This accumulation of evidence suggests that a circular configuration of interests, abilities, competencies, and occupations may provide a conceptually useful framework for relating information about individuals to information about occupations.

As a result of all of the above considerations, the circular organization of career-related characteristics and occupations suggested by Holland and his associates has been adopted as the framework underlying the development of the Career Planning Profile. Several of the specific labels in Holland's configuration have been changed and two additional dimensions have been added. These dimensions (Health and Tech-

nical) are not to be considered as new or unique, but rather as combinations of the basic dimensions that focus more closely on important areas of career education. Figure 2.2 shows the circular configuration for the eight dimensions of career-related characteristics and occupations, hereafter called "Career Clusters." These Career Clusters have served as the organizing theme of the Career Planning Profile. They have been used to guide the development of a vocational interest inventory, to organize related abilities and competencies, and to structure the presentation of career-related information in the Career Planning Profile Student Report.

The classification of occupations. The primary purpose of using an educational and occupational classification system in guidance is to allow students to survey a wide variety of educational programs and occupations. Table 2.2 presents educational programs and occupations classified into the eight Career Clusters. By examining the educational programs and occupations in each of the clusters, students may obtain a better idea of the variety of occupations related to their own preferences.

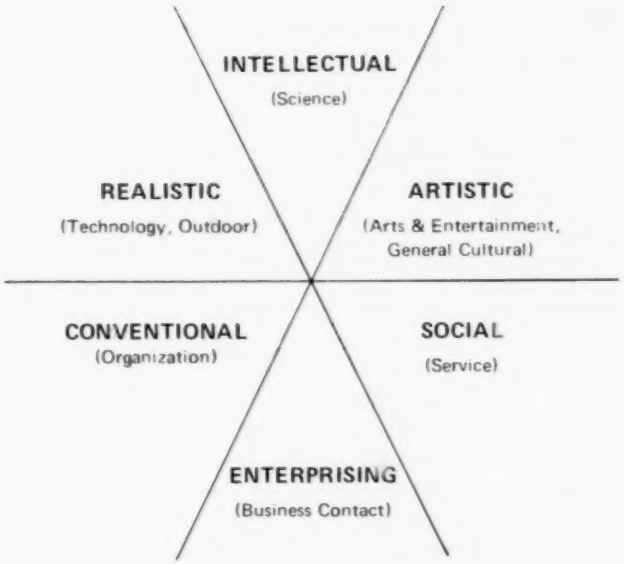
Development of an interest inventory. The circular configuration of interests presented in Figure 2.2 was also used as a guideline for developing scales for a new interest inventory—the ACT Vocational Interest Profile. Each basic dimension of the circular configuration was used to define an interest domain. Further description of the development of the Vocational Interest Profile is presented later in this chapter.

Organization of career-related characteristics. As Career Planning Profile measures were added or modified, decisions concerning their development were made in terms of their

TABLE 2.1

Classifications of Occupations and Vocational Interests

Holland	Roe	Super	SVIB-Basic	Kuder OIS	MVII
Realistic	Technology Outdoor	Technical or Material	Adventure Tech. Resp. Mechanic Agriculture	Farmer Carpenter Policeman Printer Engineer Elec. Eng.	Carpentry Electronics Outdoor Service Mechanical Food Service
Intellectual	Science	Scientific	Mathematics Science Nature Medical Sci.	Mathematician Phys. Sci. Chemist Bio. Sci. Physician Medical Rel.	Health Service
Artistic	Arts & Enter. Genl. Cultural	Musical and Artistic	Art Music Religion Writing	Architect Clin. Psychol.	
Social	Service	Humanistic or Social Welfare	Teaching Social Serv. Rec. Lead.	Soc. Casewkr. Minister	
Enterprising	Bus. Contact	Bus. Contact	Pub. Spk. Law/Pol. Merchandising Sales	Lawyer Personnel Mgr. School Supt.	Sales-Office
Conventional	Organization	Bus. Detail	Bus. Mgmt. Office Military	Bus./Mkt. Mgr. Banker Accountant	Office Work "Clean Hands"



NOTE.—Holland's categories are shown in capital letters.

Fig. 2.1. Circular ordering of Holland's categories and the corresponding ordering of the categories of Roe.

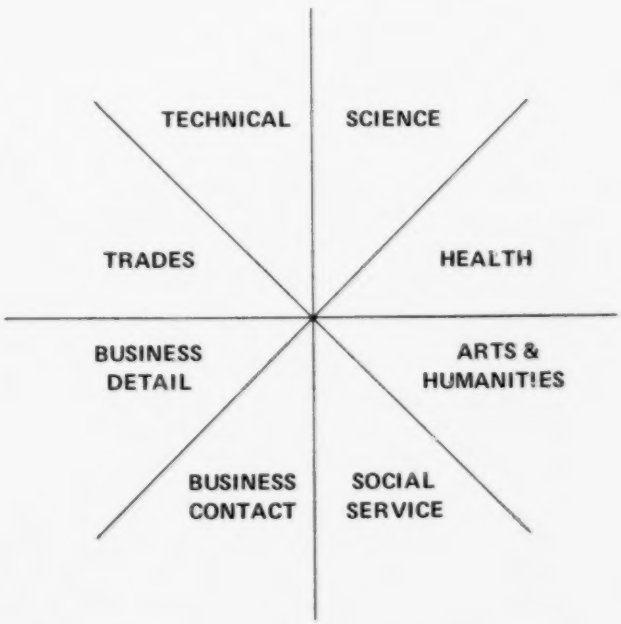


Fig. 2.2. Circular configuration of career-related characteristics and occupations used in development of the Career Planning Profile.

relationship to the Career Clusters. In particular, career-related competencies—those activities in which students indicated they had frequently participated—were modified to fit the Career Cluster framework. Also, an attempt was made to include only those Ability Measures which previous research and theory have shown to be related to the Career Cluster areas. More detailed information concerning the development of these measures is included in the section on the content of the Career Planning Profile.

Developmental History of the Career Planning Profile

The current form (Form G) of the Career Planning Profile has evolved over a period of more than 3 years. A number of modifications have been made from one form to the next to mold the instrument to the needs of the user—student and institution alike. Additional changes in the instrument will occur as user needs dictate. This can be readily accomplished since a new form of the Career Planning Profile is constructed each year. A brief review of the evolution and construction of the current form will provide good perspective on the nature of the instrument.

In November of 1968 a precursor of the present instrument (Form A) was administered to 150 students in a California 2-year college. During the fall and winter of 1969, Form B of the instrument was administered to approximately 1,400 students in six different 2-year colleges in Pennsylvania, Iowa, Oregon, Texas, and Colorado. Analyses of results for selected students tested in October 1969 led to the administration of a revised version of the instrument (Form C) to 450 students in nine high schools in the state of Iowa. Results and analyses from both these tryouts led to further revisions and refinements which were incorporated in Forms D and E and given to 178 students at a 2-year college in Iowa and to 597 students at three 2-year colleges in Illinois in the spring of 1970. Analysis of these data suggested revisions in the time limits of the Ability Measures, modifications of old ability items, construction of new items, modifications in the directions to provide greater clarity, and revision of the item format of several Student Information Section items.

As these tryouts were being conducted, three Advisory Councils and a panel of students were asked to review the program and to make suggestions for its further development and improvement. Advisory Council I consisted of vocational-technical educators and researchers. Advisory Council II consisted of student personnel workers and deans of students from community colleges and vocational-technical institutions. These two groups of vocational educators, each from its own perspective, focused on the special needs of students and educators in occupational-technical curricula. The ACT Community College Advisory Council, consisting of community college leaders, also gave direction to the development of the program. The panel of students, drawn from a broad range of occupational training programs at Milwaukee Area Technical College, reviewed the instruments and offered helpful suggestions. Recommendations from each of these groups were considered in revisions of the instrument. In addition, instructors in vocational-technical programs in

TABLE 2.2

Career Clusters Used in the Career Planning Program

Trade and Industrial Fields

Agricultural Mechanics
Air-conditioning, Refrigeration, or Heating Mechanics
Aircraft Mechanics
Appliance Repair
Automotive Body Repair
Automobile Mechanics
Business Machine Maintenance
Carpentry
Data Systems Repair
Drafting
Electrical Fields (excluding technology)
Electronics (excluding technology)
Graphic Arts (printing, linotype, etc.)
Heavy Equipment Operations
Laundry, Dry Cleaning, etc.
Leatherworking (shoe repair, manufacturing, etc.)
Machinework (tool & die, etc.)
Masonry (brick, cement, or stone)
Metalworking
Plumbing or Pipefitting
Radio-TV Repair
Small Engine Repair
Upholstering
Watch Repair & Other Instrument Maintenance & Repair
Welding
Woodworking (cabinetmaking, millwork)
Other Trade & Industrial Fields

Technical Fields

Agriculture Production
- Farming, Ranching
- Forestry
- Horticulture
- Soil Conservation
- Wildlife Management
- Other Agricultural Applications

Engineering Applications
- *Engineering—4-year programs
- Engineering Technology—Aeronautical
- Engineering Technology—Automotive
- Engineering Technology—Civil
- Engineering Technology—Electrical or Electronic
- Engineering Technology—Industrial or Manufacturing
- Engineering Technology—Mechanical

Other Engineering Applications

Other Applications
- Pilot

For additional technical areas (medical technology, police science, agri-business, etc.), see lists for other fields.

Natural Science Fields (4 Years of College Required)

*Biological Sciences
*Mathematics
*Physical Sciences (astronomy, chemistry, geography, geology, physics, etc.)

Health Fields

*Advanced Medical Fields (dentistry, medicine, optometry, radiology, etc.)
Dental Assisting
Dental Hygiene
Dental Lab Technology
*Dietitian (4 years of college required)
Dietetic Technology
Environmental Health Technology
Medical Assisting
Medical Technology
Mental Health Technology
Nursing (practical)
Nursing (registered)
*Occupational or Physical Therapy (4 years of college required)
Occupational or Physical Therapy Aide
Radiological & X-Ray Technology
Other Health Fields

Arts and Humanities Fields

4 Years of College Required
- *English & Literature
- *Journalism
- *Music
- *Philosophy, Theology or Religion
- *Other Arts & Humanities (foreign language, history, etc.)

2-Year (or shorter) Programs
- Arts & Sculpture
- Commercial Art
- Commercial Photography
- Interior Decorating
- Radio-TV (related to broadcasting)

Social Science and Public Service Fields

Barber
Beautician or Cosmetologist
Child Care Aide
*Community Service Work
Fireman
Food Service (baker, cook, chef, waiter, waitress)
Home Economics (occupational)
Housewife (homemaker)
*Law
*Physical Education & Recreation
Police Science
*Social Sciences (4-year programs: economics, psychology, political science, etc.)
Stewardess
*Teaching
Teacher Aide
Other Social Service Fields

Business Contact and Marketing Fields

Advertising Services
Agricultural Business
*Business Administration (4 years of college required)
Department Store Marketing
Finance, Credit, Insurance
Food Marketing
Hotel, Motel, & Restaurant Management
Real Estate
Recreation & Tourism
Sales & Retailing
Transportation
Other Business Contact & Marketing Fields

Business Detail and Office Fields

Accounting
Computer Programming
Data Processing
Office Management (supervisory & personnel)
Office Machines & Procedures (filing, operating duplicating machines)
Secretarial Science
Other Business Detail & Office Fields

*Indicates programs intended for transfer to 4-year degree.

California and Iowa were interviewed for their ideas on the characteristics of students that are related to success in the programs they teach. Finally, student reactions to taking the instrument were collected.

On the basis of these sources of information, Form F was prepared for use in a nationwide normative study (described later in this chapter) during the fall of 1970. The results were compiled and summarized in *Career Planning Profile National Norms for Vocational-Technical Students beyond High School*. As with earlier forms, these data were analyzed to determine the appropriateness of the information collected. The difficulty, speededness, and related item characteristics of the Ability Measures were examined to evaluate their psychometric characteristics. The intercorrelations of the Career Planning Profile scales were examined to determine the degree of overlap. In addition, the predictive and construct validity of the various measures were analyzed to assess the usefulness of each type of measure. Examination of these data contributed to the development of the present form (Form G) of the Career Planning Profile.

Content of the Career Planning Profile

Form G of the Career Planning Profile is composed of three major sections: the Student Information Section, the Ability Measures, and the Vocational Interest Profile. A brief review of the content of each section of the Career Planning Profile is presented below.

Student Information Section

The information collected by the Student Information Section can be organized into three major areas: (a) the student's educational and vocational plans; (b) the student's educational background and future plans for school; and (c) the student's career preferences and competencies. Information about the student's self-reported high school grades and self-estimates of various personal characteristics is also collected, the latter after the Career Planning Profile Student Reports have been returned to the students.

Educational and vocational plans. The educational and vocational plans and aspirations of an individual provide two very important pieces of information. First, a student's present outlook and goals are defined; and second, a base line for the direction and amount of change is established. Expressed choice of occupation has been shown to be related to actual choice over 1-, 2-, 4-, and 10-year intervals (Astin, 1965; Holland, 1962, 1963, 1964; Holland & Lutz, 1967; Strong, 1943). Whitney (1969) suggested that a person's expressed vocational choice predicts his future employment about as well as interest inventories and that expressed choices of occupational and educational fields are moderately stable over 1- to 5-year periods during and after college. Lutz (1968) showed that educational aspirations are fairly consistent over the high school-to-college transition.

In the Student Information Section, the student is given the opportunity to indicate his expected educational program and his first and second occupational choice from an extensive list organized around the eight career clusters previously discussed. Also, the student is asked to indicate *when* he made his occupational choice and *how committed* he is to it. These items provide useful information to the counselor concerning the nature and certainty of a student's career plans.

Educational background and plans. To provide the student and institution with information about the context in which career decisions are made, background information is collected on items such as birth date, sex, the number of students in the student's high school graduating class, whether the student has taken honors courses in high school, his racial-ethnic background, his educational aspiration, and his high school grades. Information on father's and mother's occupational and educational background is also collected, but is reported only in the group summaries provided to institutions. The usefulness of background or biographical variables in absolute and differential grade prediction, dropout studies, and placement has been demonstrated in a number of studies (Anastasi et al., 1960; Astin, 1964; Freeberg, 1966; French, 1963; Judy, 1966; Lunneborg, 1968; Lunneborg & Lunneborg, 1966; Myers, 1952).

Questions concerning educational needs are included in the Student Information Section to provide an opportunity for colleges to be alerted to the needs of their entering students. In a study designed to determine how accurately information provided by the precollege student concerning his needs and expectations reflects the student's later behavior during his first year of college, Lutz (1968) showed that students generally do what they say they will do, or something closely related to it. When students fail to follow through, their behavior seems to reflect not only a change of mind but also a change in the policies and opportunities presented by their colleges. The results of this study definitely suggest that self-reported information on anticipated needs is useful in planning for and counseling with entering students.

In the Student Information Section, the student checks those items, from the list below, with which he would like to receive help during his first year of college:

- Financial aid
- Finding employment
- Finding a place to live
- Finding a day care center
- A health problem such as a physical handicap, diabetes, etc.
- Choosing a major
- Improving study skills
- Improving reading skills
- Improving writing ability
- Improving math skills.

In addition to the student's responses to the questions on need for financial aid and employment listed above, two other indicators of financial need have been included in the Student Information Section: (a) the number of hours the student plans to work outside of class, and (b) an estimate of family income. (The family income item is not reported for individual students but only in the summaries provided through the

Career Planning Program research services.) Baird (1967) suggested that family income seems to be one of the most influential factors in the social background of college-bound students. Numerous studies have also shown that family income has a substantial effect on plans for college attendance and choice of occupation. Lutz (1968) provided evidence that the proportion of students who said they planned to work and actually did so 1 year later varied from slightly over 50% for 4-year institutions to nearly 75% for 2-year institutions. Also, a substantial proportion (approximately 45%) of 2-year college students who did not plan to work part time during their first year actually did so.

To provide students with a broad educational experience, institutions are interested in learning about the types of extracurricular activities in which their students are planning to participate. This information can be used to modify existing extracurricular programs, to develop new programs, and to identify potential participants in these programs. The following list indicates the extracurricular activities which students may check:

- Instrumental music
- Vocal music
- Writing
- Art
- Acting
- Debate
- Student government
- Fraternity or sorority
- Campus religious organization
- Campus political organization.

Other information related to a student's plans includes where he expects to live while attending school and whether he expects to have a car on campus.

Self-reported high school grades provide an index of past performance as well as a useful predictor of future performance. The reliability and validity of self-reported high school grades have been studied extensively, and most studies have found students report their grades honestly. Davidsen (1964) reported that the correlations between student-reported and school-reported grades ranged from .91 to .93. More recently Maxey and Ormsby (1971) found a correlation of about .86 between self-reported and school-reported high school grades for a large representative sample of our nation's high school seniors. Only a slight tendency to overestimate actual grades was noted. Accurate and discrepant reporters did not differ significantly from each other in terms of sex, race, size of high school graduating class, and parental income level. Other studies have also indicated the predictive efficiency of self-reported grades (Bogue, 1964; Hanna, Bligh, & Lenke, 1970; Hoyt, 1964).

Asking an individual to rate himself on a number of traits relative to his peer group provides an indication of how he perceives himself. Another advantage of self-report data is that considerable information is obtained in a relatively short period of time. Hence, 10 traits, described below, are listed on the back of the Career Planning Profile Student Report, and the student is asked to rate himself when compared to persons his own age on a 4-point scale ranging from Below Average to the Top Ten Percent. The following traits are covered:

- Academic Motivation (desire and determination to succeed in school)
- Work Motivation (desire and determination to succeed on a job)
- Artistic Ability (drawing, dancing, playing a musical instrument, writing, painting)
- Clerical Ability (keeping neat and accurate records, filing, typing, bookkeeping)
- English Ability (writing, understanding literature, using correct grammar)
- Math Ability (working math problems, understanding math reasoning)
- Mechanical Ability (working with tools, fixing things, understanding how things work)
- Scientific Ability (doing laboratory experiments, understanding scientific principles)
- Social Self-Confidence (at ease in a social setting, able to talk easily with people)
- Working with People (getting along with others, having an agreeable personality).

The usefulness of this type of self-rating has been reported in numerous studies. Several studies (Biggs & Tinsley, 1970; Doleys & Renzaglia, 1963; Irvine, 1965; Pervin, 1966; Young, 1954) have shown that students can usefully rate their academic potential. Abe and Holland (1965) indicated that students entering diverse educational majors describe themselves differently in terms of self-estimates. Other research has indicated that students' perceptions of themselves may be potent determinants of behavior (Holland & Baird, 1968). Changes in self-estimates over time have also been related to differential college characteristics (Skager, Holland, & Braskamp, 1966) and to student accomplishments in college (Skager & Braskamp, 1966).

Career preferences and competencies. The student's job values and his preferences for certain types of working conditions are important considerations in vocational exploration, self-exploration, and career planning.

In a comprehensive review of the concept of work values, Zytowski (1970) found that while the concept of work values has been employed by many researchers, there does not seem to be a universal set of work values which are acceptable to everyone. Examples of inventories developed to measure work values include Hammond's Occupational Attitude Rating Scale (OARS), Stefflre's Vocational Values Inventory (VVI), Super's Work Values Inventory (WVI), and the Minnesota Importance Questionnaire (MIQ). According to Zytowski (1970), an adequate description of the spectrum of work values requires 12 to 15 values, though factor analysis generally results in 3 to 6 major types of values.

Items measuring work values in the Student Information Section provide three indices of intrinsic work values and three indices of extrinsic work values as suggested by Centers and

Bugental (1966), and Herzberg, Mausner, & Synderman (1959). The student is asked to indicate the relative importance of the following six job characteristics on a scale from 1 to 4 (4 = very important):

- Co-Workers (working with people I like)
- Independence (being my own boss, doing the work as I want with nobody watching over me)
- Interest (work that I enjoy doing, that is interesting to me)
- Job Security (having a steady job even if the job is not especially enjoyable, having a job where I would not be fired)
- Pay (being well paid for my work)
- Responsibility (being responsible for making decisions and for the work of other people).

For many students, these questions may provide the first opportunity to consider job values in an organized way. Hopefully, they will be the stimulus for repeated consideration thereafter.

The setting in which work is done can also play an important role in the career plans of students. Long (1952) devised an instrument, the Job Preference Survey, which was based on independent components of work interests related to job activity preferences at nonprofessional levels. Analyses of the instrument yielded six bipolar dimensions: Routine-Varied, Indoor-Outdoor, Hazardous-Nonhazardous, Sedentary -Bodily Active, Isolative-Gregarious, Precise-Approximate. In the Career Planning Profile, four of these dimensions were rephrased and presented in direct question form to measure a preference for different types of working conditions. The student responds to the bipolar dimensions (Indoor-Outdoor, Work with Others-Work Alone, Varied Work-Routine Work, and Physical Work-Nonphysical Work) along a 4-point scale to indicate which types of working conditions he prefers.

People often develop special skills in areas not typically taught in the academic classroom. These skills may have developed because of an interest in certain hobby areas or because of work experiences at home or on a previous job. Measures of career-related competencies were included in the Career Planning Profile to survey these frequently ignored talents. Previous research (Brue, Engen, & Maxey, 1971) has shown that certain competencies differentiated between occupational and transfer level students in community colleges. As one might expect, the occupational men rated themselves higher in the skilled and technical areas while the transfer men had higher self-ratings in community service, leadership-persuasive, and artistic areas. The women in occupational programs rated themselves higher in the secretarial, clerical, community service, and home economics areas. The transfer women rated themselves higher on language skills. Measures of competencies in the skilled and technical areas were also found to contribute more than any other variable to the prediction of the enrollment of men in an occupational program. For women, the home economics competencies provided the greatest contribution to program prediction.

Early forms of the Career Planning Profile assessed career-related competencies in nine areas—Skilled Trades, Scientific, Community Service, Home Economics, Sports, Artistic, Business, Clerical, and Leadership. In Form G, scales which are not related to the career clusters and scales which resulted in highly skewed distributions have been omitted or modified. In addition, the item format for all scales has been changed from two response categories to three to improve the scale distributions and internal consistency reliabilities.

The career-related competency scales on Form G consist of lists of work-related activities. Students are asked to indicate how frequently they have participated in each activity (e.g., never, at least once, several times). The seven competency scales cover the following career cluster areas: Trades, Technical, Science, Arts, Social Service, Business Contact, and Business Detail. A scale has not been developed for the Health cluster because of the limited opportunities in this area for high school students. Examples of the types of activities included in the Competency Scales are: making simple TV repairs, designing clothing, operating a bookkeeping machine, working with a children's group, etc.

Ability Measures

Research and theoretical work from the past 50 years has led to the currently well-accepted position on the diversity of human ability. The goal in constructing the Career Planning Profile was to select those types of human ability most relevant to career education and successful job performance and to measure those abilities as efficiently as possible.

Our education-oriented society has tended to provide great rewards for performance in an educational setting. Research has consistently shown that a verbal component of ability pervades the academic learning situation. Transmission of knowledge and information is largely verbal. In addition, the traditional academic curriculum includes quantitative subject matter which has common elements in many fields of study (throughout the sciences and in the business fields, for example). Thus measures of both verbal and quantitative ability seemed appropriate to career education.

However, research has also demonstrated the limited applicability of academic abilities. Even a cursory examination of the world of work reveals the innumerable occupations and aspects of occupations for which academic abilities are used little, if at all, on the job. In addition, the grades earned in an educational setting are only slightly related to later successful job performance in many occupations. Studies have also shown the essential independence of academic performance (in school and on tests of academic ability) and achievements in areas such as art, music, drama, leadership, writing, and science. In the adult population in the United States, other abilities and skills in addition to and instead of academic abilities are both necessary and well rewarded. Thus, to assess properly an individual's educational and vocational assets and liabilities, these other abilities must also be assessed.

Certainly there is much more to be learned about the abilities critical to success in career education programs and on the job. However, a long history of test use in the prediction of educational and vocational criteria already exists. From this accumulated stockpile of information, areas of "nonacademic" ability shown to be most useful in the past were selected for

inclusion in the Career Planning Profile. The areas selected were nonverbal reasoning, mechanical skills, clerical skills, and space relations. In selecting these areas, other areas were necessarily excluded, for example, perceptual skills and manual dexterity. Different aspects of perceptual skills are covered in the Career Planning Profile Clerical Skills and Space Relations Scales. Manual dexterity measures, while useful for certain specific occupations, have been shown in reviews by Ghiselli (1966) and Prediger, Waple, and Nusbaum (1968) to have little relationship to performance in career education programs or on the job.

Always guiding the construction of the Ability Measures were (a) the need to limit the time on individual scales so that a variety of abilities could be measured; (b) the need to cover measures relevant to career guidance; (c) the need to predict performance in career education programs; and (d) the need to minimize verbal content. Brief descriptions of the Ability Measures and a summary of the characteristics of the items are provided below.

Reading Skills. Reading Skills is a 40-item, 20-minute scale designed to assess the student's reading ability. The items measure the ability to read and understand factual material as well as more subtle aspects of comprehension. The scale is composed of short paragraphs on career-related topics followed by questions. Early passages deal largely with factual matter; later ones require interpretation and comprehension of more subtle and complex reading matter. The range of difficulty and subject matter is broad and affords the opportunity for use of the scale in the evaluation of the student's reading level for programs with widely differing reading requirements. Tables 3.2 to 3.5 (in Chapter 3) indicate that the test is largely a power test with a good spread of item difficulties and generally adequate item-total score biserial correlations.

Numerical Computation. This section of the Career Planning Profile was constructed to measure, as simply as possible, speed and accuracy in the most basic arithmetic skills. Numerical Computation is a 6-minute scale containing 30 arithmetic computation items testing addition, subtraction, multiplication, and division with whole numbers, decimals, and fractions. The format used presents an arithmetic operation such as "8 3/4 + 7 2/3" along with five possible answers, the last of which is always "Not Given." The addition and subtraction of whole numbers are the easiest items while operations on fractions are more difficult. A particularly good distribution of item difficulty was found. Table 3.2 shows that Numerical Computation is speeded, as planned. The assessment of the elementary numerical operations gives sufficient information for many programs or careers requiring basic quantitative skills.

Mathematical Usage. The Mathematical Usage scale was designed to measure ability to apply arithmetic operations to the solution of practical reasoning problems. Mathematics beyond elementary algebra is not assessed, however, by this 20-item, 15-minute scale. Since the scale was designed primarily for programs requiring some sophistication in mathematical applications, the item statistics in Tables 3.2 to 3.5 suggest this ability measure is quite difficult for typical post-high school career education students. The section is especially applicable to fields requiring more sophisticated mathematical reasoning skills such as engineering technology and related technical fields.

Nonverbal Reasoning. Although there tends to be a large verbal component in many paper and pencil tests, a number of attempts have been made to measure abstract reasoning ability without reference to verbal material. This 35-item, 10-minute section was intended to measure the student's reasoning ability without relying on his verbal understanding. The student must discover the governing principle relating a series of figures or pictures to each other. Then he must choose from a second series one picture or figure which is related to the first series. Fine visual discriminations are not required as the characteristics are distinctive and clearly drawn. The Nonverbal Reasoning section is helpful in identifying able students who have language or reading handicaps. The items demonstrate good statistical properties, but Table 3.2 indicates there is more speed involved than would be desirable. Hence, speededness will be reduced in Form H.

Mechanical Reasoning. Mechanical Reasoning is a 42-item, 15-minute scale designed to assess, in a verbally simple form, the student's familiarity with and understanding of the workings of mechanical devices and the principles governing the movement and interaction of objects. In this respect, it is more similar to the Bennett Mechanical Comprehension Test than to mechanical performance or tool identification tests. Tables 3.2 to 3.5 indicate that Mechanical Reasoning is basically a power test composed of disciminating items with a good spread of item difficulties. This test measures a type of ability especially relevant to many trade and technical programs.

Clerical Skills. Tests of clerical ability have typically involved perceptual speed using verbal or numerical symbols. Symbol matching has been a common format. The Clerical Skills section of the Career Planning Profile deviates from the traditional format to provide a more complicated clerical task involving the ability to follow directions as well as traditional perceptual speed and accuracy.

In the Clerical Skills section, a list of shipments of fruits to cities throughout the country is provided which gives the destination of the shipment, the distance the shipment must travel, and the weight of the shipment. From a table giving shipment cost by distance and weight, the student finds the cost of a shipment. Then the shipper cost is converted by another key to an answer to be marked on the answer sheet.

Six minutes are allowed for work on a list of 35 shipments in this short scale. The scale is highly speeded as is appropriate for a clerical scale. The item characteristics in Tables 3.2 and 3.4 reflect the results of the homogeneous item type. Item differences that occur are due almost entirely to their location in the scale.

Space Relations. The ability to visualize and relate objects in space has long been considered an ability important to many kinds of occupations. Pictured stacks of blocks, similarly, have long been in use as an item format for testing this ability. Examples of this format are the block subtest of the MacQuarrie Test of Mechanical Ability (MacQuarrie, 1925) and the Thurstone battery (Thurstone, 1937). This format was selected because it allows a large number of items in a short

time limit and has face validity for the kind of spatial ability it should be measuring.

Eight stacks of blocks are pictured and in each stack 5 blocks are lettered. The student counts the number of blocks touching each lettered block. There are a total of 40 lettered blocks and 6 minutes are allotted. This scale is highly speeded, but there are large differences in the difficulty of some items regardless of the speed factor.

Language Usage. Language Usage, a 40-item, 6-minute test, is the most recent addition to the Career Planning Profile and measures the ability to recognize inappropriate uses of the English language. The test consists of sentences in which several parts are underlined. The student is to judge whether the underlined part is correct or incorrect. The test includes errors in punctuation, capitalization, grammar, and sentence structure.

The Vocational Interest Profile

The theoretical and empirical information on the structure of vocational interests in this chapter formed the conceptual framework used to build the Vocational Interest Profile. Two key decisions shaped the instrument. First, concrete activities were used in the items rather than occupational titles or personality traits. Second, the decision was made to expand the six Holland categories to eight in order to provide more specific coverage of the health and technical fields.

Initially, items were assigned to 12 scales a priori on the basis of theoretical and empirical work found in the professional literature. Thus, the Vocational Interest Profile, Form F, consisted of these 12 scales: Scientific, Health, Artistic, Social Service, Business Contact, Business Management, Business Detail, Household, Agriculture, Carpentry, Mechanical, and Electrical. Each scale consisted of 10 activities and the student was asked to express, on a 5-point scale varying from "dislike very much" to "like very much," the degree to which he would like doing the activity. Revisions and adjustments in the number of scales and their item content were made on the basis of an examination of correlation data for the items and scales. The current form, based on the reorganization of the Form F items, has the following eight scales: Trades, Technical, Science, Health, Arts, Social Service, Business Contact, and Business Detail. Representative items for each scale are presented in Table 2.3. The relation of these eight scales to the circular configuration proposed by Holland is discussed in the section on spatial configuration in Chapter 3.

Reading Level of the Career Planning Profile

A realistic concern in the collection of guidance-oriented information from students is their ability to read and understand what it is they are to do. Hopefully, the reading level of an assessment instrument will be low enough so that differences between students represent actual differences on the dimension being measured and not differences confounded by the student's inability to read and understand the directions.

Two methods were used to determine the reading level of the Career Planning Profile—the Dale-Chall and Forbes formulas. Both methods determine the frequency of difficult words and relate this index to a reading grade level.

The findings for the Career Planning Profile are presented in Table 2.4. With the exception of the general instructions and directions, the Dale-Chall index provides consistently lower reading level estimates than the Forbes index, possibly because the Dale-Chall index also considers sentence length as well as individual word difficulty. Both indices indicate that the Career Planning Profile has a sufficiently low reading level for students entering postsecondary institutions.

TABLE 2.3

Representative Items for Each Vocational Interest Profile Scale

Science

- Working in a science laboratory
- Learning about nuclear particles
- Studying physics

Health

- Assisting a surgeon during an operation
- Working with patients in a hospital
- Reading an X-ray

Arts

- Sketching and drawing
- Reading or writing poetry
- Listening to a symphony concert

Social Service

- Helping the poor
- Working for a charity
- Being a counselor

Business Contact

- Selling insurance
- Being an office personnel manager
- Being a public relations person

Trades

- Repairing an automobile
- Riveting sheet metal
- Operating a power tool

Business Detail

- Typing reports
- Sorting mail
- Keeping records for a store

Technical

- Operating a computer
- Installing a telephone
- Studying electronics

TABLE 2.4

Reading Level for Form G

Section of Career Planning Profile	Grade level	
	Forbes Formula	Dale-Chall Formula
General instructions and directions	8.5	8.5
Vocational Interest Profile items	12	9.5
Student Information Section items	11	8.5
Ability Measures (excluding Reading Skills)	7	4.5
Reading Skills	9	6.6

Norming the Career Planning Profile

Although the Career Planning Profile can be used to explore the full range of educational and vocational options, it is especially valuable for students considering career education programs. For this reason, the national norms represent students enrolled in postsecondary vocational and technical programs in community colleges and other public institutions.

Selection of the National Norm Group

The number of students enrolled in each of seven federally reimbursed, postsecondary career education areas (hereafter called *clusters*) was obtained from a report entitled *Vocational and Technical Education: Annual Report, Fiscal Year 1967* (U.S. Department of Health, Education, and Welfare, Office of Education, 1969). These enrollment figures, the latest available at the time norm group specifications were determined, are exclusive of enrollment in adult programs. State figures for each of the seven program clusters were grouped into six geographic regions. These regional enrollments, after translation to percentages, provided norm group specifications for type of program by geographic region.

The distribution within region of community colleges and other public institutions offering vocational-technical programs was also considered in formulating norm group specifications. A survey by Gartland and Carmody (1970) showed that for the nation as a whole, about two-thirds of the institutions offering postsecondary vocational-technical programs were community (or junior) colleges. Variation in this ratio was substantial from region to region, however. Hence, norm group specifications were also developed for type of institution within each of the six geographic regions.

With the norm group specifications described above serving as guidelines, institutions judged to be representative within each region were contacted and invited to participate in the national norming. Allocations of vocational-technical programs to be covered at each institution reflected the regional distribution of programs obtained from the federal report as noted above. As institutional contacts progressed, however, programs were identified that could not be readily included in the federal classification system that had been adopted. Consequently, a Social Science and Public Service Cluster and an Arts and Humanities Cluster were added to the original seven, thus making a total of nine program clusters.

Characteristics of the National Norm Group

The Career Planning Profile National Norms are based on 17,137 career education students entering 100 postsecondary institutions. Norm group testing involving more than 23,000 students took place in the fall of 1970. In cases where institutions tested students beyond the number and type specified, the additional students were not included in the national norm group. The distributions of norm group students and institutions across geographic regions are shown in Table 2.5 along with the distribution of type of institution within region. Table 2.6 shows the regional and national norm groups distribution by career education cluster. A student was considered to be enrolled in the cluster he indicated when he took the Career Planning Profile.

Because of the rapid expansion of opportunities for career education in the United States, a "status quo" for use in evaluating the representativeness of the national norm group does not exist. Development of new areas of career education keeps pace with the advance of technology. Periodically, whole states commit themselves to major investments in this heretofore neglected area of education. Hence, it is impossible to determine the degree to which Career Planning Profile norms adequately represent the changing national picture. The information presented in this report should help the reader who is knowledgeable about vocational and technical education to make his own assessment, however. To aid in this assessment, the distribution of norm group members on a number of important variables is presented below.

Characteristics of Norm Group Students

In the process of completing the Career Planning Profile, students respond to a number of questions related to their home background, educational experiences, and plans. The distributions of student responses to items of particular importance in assessing norm group characteristics are summarized in Tables 2.7 through 2.13. Tables 2.9 and 2.11 are based on all students in the norm group. The remaining tables are based on the 16,841 students who had scores on each of the Ability Measures, the numbers varying from table to table according to the number of nonresponders on a given item. Since some of the students did not answer all questions, the sample size shown for several of the tables is less than 16,841.

Characteristics of Norm Group Institutions

Names of the 125 institutions administering the Career Planning Profile during the norming phase are listed in Appendix D. The 100 norm group institutions are indicated by asterisks. The remaining institutions on the list were not

TABLE 2.5

Geographic Distribution of Norm Group Members and Institutions

Region	Component states	Regional N (% of total)	Number and type of institutions included	
			Community colleges	Vocational & technical institutions
Western	Alaska, Calif., Hawaii, Idaho, Nev., Ore., Wash.	5,612 (32.7)	29	2
Mountain-Plains	Colo., Kan., Mont., Neb., N.D., S.D., Utah, Wyo.	1,896 (11.1)	4	7
Southwestern	Ariz., Ark., N.M., Okla., Tex.	2,200 (12.8)	9	2
Midwestern	Ill., Ind., Iowa, Mich., Minn., Mo., Ohio, Wis.	1,644 (9.6)	6	2
Southeastern	Ala., Fla., Ga., Ky., La., Miss., N.C., S.C., Tenn., Va.	3,649 (21.3)	13	14
Eastern	Conn., Del., D.C., Me., Md., Mass., N.H., N.J., N.Y., Pa., R.I., Vt., W.Va.	2,136 (12.5)	9	3
National		17,137 (100.0)	70	30

TABLE 2.6

Percentage of Norm Group Enrollment in Career Education Clusters by Region

Region	N	Career education cluster[a]									Other[b]
		1	2	3	4	5	6	7	8	9	
Western	5,612	9.4	3.7	13.7	0.7	16.9	8.9	26.5	9.1	1.1	10.1
Mountain-Plains	1,896	4.1	1.7	17.1	0.1	19.4	12.3	34.3	5.7	0.3	5.0
Southwestern	2,200	5.7	2.5	9.1	0.5	23.2	10.3	36.6	1.2	0.9	9.8
Midwestern	1,644	5.8	2.9	36.7	0.3	17.6	10.0	12.8	7.6	1.0	5.2
Southeastern	3,649	4.5	4.4	16.6	0.4	29.4	6.7	20.6	5.7	2.4	9.5
Eastern	2,136	8.0	3.9	24.2	0.1	15.0	6.8	25.0	9.1	0.2	7.7
National	17,137	6.8	3.4	17.7	0.4	20.5	8.8	25.9	6.9	1.1	8.6

NOTE.—Percentages accumulate by row.

[a]Students selected their field of study from these clusters:

1 = Agriculture, Forestry & Maritime
2 = Business Contact & Marketing
3 = Health
4 = Home Economics
5 = Business & Office
6 = Science, Engineering & Technology
7 = Trade & Industrial
8 = Social Science & Public Service
9 = Arts & Humanities

[b]Includes students who used a nonexistent code number for their field of study or marked one of the following: "My future field is not included in the list"; "I have not yet selected among the many alternatives available to me (Undecided)"; "Housewife."

TABLE 2.7

Distribution of Parents' Educational Levels

Highest level of education completed	Father's education			Mother's education		
	Men	Women	Total	Men	Women	Total
Eighth grade or less	21%	22%	22%	12%	14%	13%
Some high school	17	16	17	17	20	18
High school graduate	26	24	25	39	34	37
Technical or business school	5	6	5	5	8	6
Some college	6	8	7	6	7	6
2-year college graduate	3	3	3	3	4	4
4-year college graduate	5	5	5	4	3	4
Some postcollege schooling	1	2	1	1	1	1
Received advanced degree	2	3	3	1	1	1
Do not know or prefer not to say	13	11	12	11	7	9
Sample size	10,354	6,405	16,759	10,341	6,411	16,752

TABLE 2.8

Distribution of Parents' Occupations

Occupational categories of parents	Men	Women	Total
FATHER'S OCCUPATION			
Managerial or executive	9%	10%	9%
Professional	4	4	4
Sales	4	4	4
Semiprofessional or technical	4	3	4
Semiskilled	16	18	17
Skilled trades	18	16	17
Small business owner or farm owner	15	13	14
Supervisor or public official	8	8	8
Unskilled	10	9	9
Not applicable or prefer not to say	14	14	14
Sample size	10,273	6,354	16,627
MOTHER'S OCCUPATION			
Housewife	57	54	56
Managerial, executive, or professional	4	5	4
Sales	4	4	4
Secretary-stenographer	6	6	6
Semiprofessional or technical	3	4	3
Semiskilled	9	9	9
Small business owner	2	2	2
Supervisor or public official	2	2	2
Unskilled	7	8	7
Not applicable or prefer not to say	6	6	6
Sample size	10,313	6,377	16,690

TABLE 2.9

Distribution of Ethnic Background

Student response	Men	Women	Total
Afro-American/Black	7.0%	11.6%	8.7%
American Indian	2.6	1.9	2.3
Caucasian American/White	77.6	75.0	76.6
Mexican/Spanish American	3.5	2.3	3.1
Oriental American	5.2	4.3	4.8
Other or I prefer not to respond	4.2	4.9	4.5
Sample size	10,481	6,518	16,999

TABLE 2.10

Distribution of Family Income

Student response	Men	Women	Total
Less than $3,000 per year	4%	6%	5%
$3,000 to $4,999	7	7	7
$5,000 to $7,499	14	11	13
$7,500 to $9,999	15	11	14
$10,000 to $14,999	19	14	17
$15,000 to $19,999	6	5	5
$20,000 to $24,999	2	2	2
$25,000 or more	2	2	2
Consider confidential	10	11	10
I do not know	21	31	25
Sample size	10,325	6,387	16,712

TABLE 2.11

Age Distribution

Age	Men	Women	Total
15	0.0%	0.0%	0.0%
16	1.4	0.8	1.1
17	3.1	2.5	2.9
18	32.5	46.0	37.7
19	20.1	18.3	19.4
20	8.1	6.6	7.5
21	4.7	3.7	4.3
22	4.9	2.1	3.8
23	5.7	1.6	4.1
24	4.2	1.2	3.1
25-29	7.6	4.5	6.4
30-34	2.8	3.8	3.2
35-39	1.7	3.1	2.2
40-44	1.2	2.2	1.6
45 & over	1.9	3.6	2.6
Sample size	10,583	6,554	17,137

TABLE 2.12

Enrollment Status

Enrollment	Men	Women	Total
Part-time	9.2%	8.7%	9.0%
Full-time	90.8	91.3	91.0
Sample size	8,721	5,959	14,680

included in the actual norming for one of the following reasons: (a) including them would have resulted in disproportionate representation of institutions or students from particular states or regions; (b) all sections of the Career Planning Profile were not administered; or (c) answer sheets were returned too late to be included in the norm group analyses.

A survey of norm group institutions showed that approximately one-third of their career education enrollees were part-time students (typically defined as being enrolled for less than 12 credit hours per term). From Table 2.11 it can be seen that this group of students is underrepresented in the norm group, probably because of difficulty in scheduling a continuous 3-hour testing session for them. Norms presented for part-time students in Appendix C show that those who were tested are typical of students in the norm group as a whole.

The regional distribution for community colleges and other institutions in the norm group is reported in Table 2.5. The latter category includes 15 area vocational-technical schools or centers, 10 vocational-technical institutes, 3 technical institutes, and 2 institutions identifying themselves as college-level vocational schools. Unpublished data collected as part of the national survey by Gartland and Carmody (1970) show that the percentage of community colleges among all institutions offering career education programs in a region is as follows: West (88%), Mountain-Plains (61%), Southwest (82%), Midwest (63%), Southeast (56%), and East (67%). The corresponding percentages for the national norm group are: West (94%), Mountain-Plains (36%), Southwest (82%), Midwest (75%), Southeast (48%), and East (75%). For the nation as a whole, Gartland and Carmody reported that community colleges comprise 66% of the postsecondary institutions enrolling vocational-technical students. The corresponding figure for the norm group is 70%.

TABLE 2.13

Distribution of Letter Grades for Six Subject Areas

Grade	Subject Area					
	English	Math	Social Studies	Natural Sciences	Business	Vocational
A	9%	8%	12%	8%	19%	34%
B	34	27	37	32	40	43
C	45	47	43	47	34	20
D	10	16	8	11	5	2
F	1	2	0	1	1	0
Sample size[a]	16,275	15,875	15,664	14,776	10,835	10,634
Mean[b]	2.41	2.22	2.51	2.35	2.72	3.09
S.D.	.82	.89	.82	.82	.86	.80

NOTE.—Total number of students in analysis was 16,841. All grades were self-reported.

[a]Based on number of students reporting grades.

[b]Based on a scale of A = 4, B = 3, C = 2, D = 1, F = 0.

Scaling the Career Planning Profile Measures

Except for the interest, ability, and competency measures, the information printed on the Career Planning Profile Student Report directly represents the responses of the student. Scaled scores, on the other hand, are useful in comparing a student's results with those of various reference groups, e.g., students enrolled in a particular career education program cluster, "older" students, and part-time students. Scaled scores also facilitate representation of a student's general pattern of interests and abilities. For this reason, a standard score scale was developed for the Ability Measures and the Vocational Interest Profile, and a quasi-scale with verbal descriptors was constructed for Career-Related Competency Measures. Scaling was conducted on Form F, the form used in all norm group testing. Subsequent forms will be equated to the score scales developed for Form F.

Vocational Interest Profile and Ability Measures. Cumulative frequency distributions of raw scores on the Interest Scales and Ability Measures were used in converting raw scores to normalized standard scores ranging from 20 to 80 with a mean of 50 and a standard deviation of 10. The Vocational Interest Profile was scaled on the 16,926 men and women in the norm group who had scores on all eight measures. The Ability Measures, exclusive of Language Usage, were scaled on the 16,841 norm group members with scores on all seven remaining measures. Because Language Usage was not included in the tests administered to the norm group, scaling will be based on testing conducted during the 1971-72 academic year.

Career-Related Competency Measures. Raw scores on the Form F Career-Related Competency Scales indicated the number of competencies checked by the student in a given competency area. These scores were transformed into verbal labels indicating the relative number of competencies reported when compared with students in the norm group. The labels used were MANY, SOME, FEW, and NONE. Scaling for each Career-Related Competency involved all students having a score on that measure. Students indicating no competencies in a given area (i.e., those with a raw score of zero) were assigned the label NONE. On the basis of cumulative frequency distributions for men and women combined, scores falling at approximately the 90th percentile or above were assigned the label MANY. The labels SOME and FEW were assigned to the remainder of the raw score distribution falling above and below the 50th percentile, respectively. The resulting four-category, quasi-scale should be adequate for identifying students who have talent in areas not usually assessed by standardized tests.

Beginning with Form G, students mark competency items according to whether they have performed the activity described (a) never, (b) at least once, or (c) several times. Weights of 1, 2, and 3, respectively, are allocated to the responses. The resulting new score scales have been equated to the original scales. Equipercentile techniques were used with the scores of post-high school career education students who completed both forms of the competency items in the fall of 1971.

National Norms

The Career Planning Profile National Norms are discussed in this section. The actual norms tables and profiles have been placed in the Appendixes where they may be more easily used for counseling and administrative purposes.

Types of Norms

Norms are presented for the Ability Measures,[1] Vocational Interest Profile Scales, Career-Related Competencies, self-reported high school grades, and self-estimates of Career-Related Personal Characteristics for each of the norm groups listed below. (Distributions for ratings of Job Values and Working Condition Preferences are also given in the General Norms.)

1. General Norms (men, women, and total): Appendix A
2. Program Cluster Norms (men and women): Appendix B
   a) Seven vocational and technical Program Clusters
      - Trade and Industrial
      - Technical—Agriculture Production
      - Technical—Engineering Applications
      - Health
      - Social Science and Public Service
      - Business Contact and Marketing
      - Business Detail and Office

   b) Four transfer Program Clusters
      - Natural Science and Health
      - Arts and Humanities
      - Social Science and Public Service
      - Business Administration
3. Special Subgroup Norms (men, women, and total): Appendix C
   - Age 25 and Older
   - Part-Time Students
   - Afro-American/Black
   - Mexican-Spanish/American

A special feature of the Program Cluster Norms are profiles showing the 10th, 25th, 50th, 75th, and 90th percentile points for the Ability Measures and Vocational Interest Profile Scales. For ease of comparison with the General Norms, the norms tables for each Program Cluster show the distribution of the General Norm Group along with the Program Cluster distribution.

Local norms are also available through the Career Planning Program research services (*Profile of Career Applicants* and *Career Planning Analysis Service*) provided at no charge to participating institutions. These norms should be especially useful for institutions enrolling students who are not typical of career education students in general.

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[1] Norms for Language Usage are provided only for the total General Norm Group. They are not yet available for any of the other norm groups.

General Norms

The General Norms are based on students enrolled in career education programs at the time they took the Career Planning Profile. Since some students failed to answer all the items on the Career Planning Profile, the number of students in the General Norm Group varies somewhat from measure to measure.

As expected, consistent sex differences exist for many of the Career Planning Profile measures. Examples of measures for which men obtained higher scores include the Mechanical Reasoning Ability Measure and the Trades, Technical, and Science Interest Scales. In addition, more men than women received a rating of MANY or SOME on Career-Related Competencies such as Trades and Technical and had higher self-estimates on Career-Related Personal Characteristics such as Mathematical Ability and Mechanical Ability.

On the other hand, women obtained higher scores on the Clerical Skills Ability Measure and the Health, Arts, Social Service, and Business Detail Interest Scales. They received higher ratings than men for Career-Related Competencies such as Arts, Social Service, and Business Detail. Women also had higher self-estimates for Career-Related Personal Characteristics such as Academic Motivation, Clerical Ability, and English Ability. In general, men obtained higher scores on the mechanical and technical measures and the women obtained higher scores on the academic, clerical, and social service measures. The reader interested in making a more detailed analysis of these and other trends should refer to the norms tables in Appendix A.

Program Cluster Norms

The derivation and composition of the eight Career Clusters used to organize Career Planning Profile data was explained earlier in this chapter. Slight modifications of these eight Career Clusters were made to provide norms reflecting level of educational aspiration. The first of these modifications was the differentiation of vocational and technical programs and transfer programs. This distinction provided the basis for the two types of Program Cluster Norms presented in Appendix B.

Vocational and technical program cluster norms. All programs which comprise the Trade and Industrial *Career Cluster* and the Business Detail and Office *Career Cluster* are vocational or technical programs. Hence, no changes were made in those clusters in forming the *Program Cluster* Norms. Two Technical Program Clusters were derived from the Technical Career Cluster according to the nature of the educational program. The two are: Technical—Agriculture Production and Technical—Engineering Applications. This latter program cluster is the sole exception to the vocational-technical and transfer distinction, for it includes students beginning 4-year engineering programs as well as students in engineering technology programs. It was felt that such students would be more similar to students in engineering technology programs than to students in other transfer programs. Moreover, the majority of those pre-engineering students who change their career goals will probably change to engineering technology programs rather than to some nonengineering transfer program.

All but three of the educational programs within the Health Career Cluster are vocational or technical programs. These three transfer programs were deleted from the Health Program Cluster and combined with Natural Science transfer programs as noted below. The five transfer programs within the Social Science and Public Service Career Cluster were also deleted before forming the Program Cluster Norms for Social Science and Public Service. The Business Contact and Marketing Program Cluster is identical to the corresponding Career Cluster except for the deletion of data collected from students enrolled in Business Administration transfer programs.

Transfer program clusters. The educational programs comprising the Natural Science Career Cluster are all transfer programs. These were combined with the transfer programs from the Health Career Cluster to form the Natural Science and Health Program Cluster. The transfer programs within the Arts and Humanities Career Cluster were used for the Arts and Humanities Program Cluster. The Social Science and Public Service Program Cluster is derived from students in transfer programs in the Career Cluster of the same name. Finally, the Business Administration Program Cluster is comprised of students pursuing Business Administration transfer programs within the Business Contact Career Cluster.

Special Subgroups

Appendix C presents norms for subgroups selected from the General Norm Group. The norms for these particular subgroups are provided because of their special relevance to career education, counseling, and placement.

CHAPTER 3

RELIABILITY AND RELATED CHARACTERISTICS

Descriptive information for the measures comprising the Career Planning Profile was presented in Chapter 2. The purpose of this chapter is to provide information about the reliability and intercorrelation of Career Planning Profile measures and their relationship to other similar measures. In addition, evidence of the scale structure of the Vocational Interest Profile is presented.

Reliability

An important characteristic of any measure is its reliability, that is, the consistency and the accuracy of measurement.

Several different methods for determining reliability are available. Since the selection of an appropriate method depends on various factors such as the anticipated use of the measure, its composition, and its degree of speededness, a brief review of the item characteristics for selected measures will be presented prior to reporting estimates of reliability for the Ability Measures, Interest Scales, and Career-Related Competencies. Unless otherwise noted, the data reported in this chapter apply to Form F of the Career Planning Profile, the form in use during 1970-71.

Two basic samples of students were used for the reliability analyses. One sample (N = 1,713), hereafter called Sample A, was obtained by selecting every 10th record from the Career Planning Profile General Norm Group. As indicated in Table 3.1, the means and standard deviations of the Ability Measures and Interest Scales do not differ from the General Norm Group in a meaningful or systematic manner.

The second sample, Sample B, consisted of 314 students enrolled in a broad range of career education programs in three institutions located in South Carolina, New Mexico, and California. This sample, used for test-retest analysis, was

TABLE 3.1

A Comparison of the Career Planning Profile General Norm Group with Sample A and Sample B

Scales	General Norm Group		Sample A		Sample B	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
ABILITY MEASURES (Form F)						
Reading Skills	50.08	9.97	50.14	9.90	49.30	10.07
Numerical Comp.	50.00	10.11	49.82	10.04	49.60	9.92
Math. Usage	49.85	10.39	49.87	10.00	49.60	10.48
Nonverbal Reas.	49.86	10.04	49.75	9.92	47.70	10.16
Mech. Reas.	50.02	10.04	49.94	10.10	46.10	10.19
Clerical Skills	50.07	10.59	50.19	10.37	50.13	10.50
Space Relations	49.92	10.36	50.07	10.25	47.20	9.65
INTEREST SCALES (Form G)						
Science	50 01	9.98	50.09	10.06	47.22	9.90
Health	49.96	10.01	49.91	10.01	51.27	10.68
Arts	50.00	9.86	50.04	9.83	51.23	10.40
Social Service	50.09	9.95	50.08	10.05	52.64	9.34
Business Contact	50.02	9.95	50.21	10.05	52.17	10.26
Business Detail	50.00	9.92	50.34	9.93	52.58	10.70
Trades	50.03	10.57	50.30	10.52	46.64	11.00
Technical	49.98	10.09	50.19	10.40	48.10	10.12

NOTE.—General Norm Group sample included 17,137 students, Sample A included 1,713 students, and Sample B included 314 students.

initially tested with Form F in October of 1970 and then retested in December, an interval of approximately 60 days. A comparison of Sample B with the General Norm Group is also presented in Table 3.1. Again, no meaningful or systematic differences were found between groups.

Ability Measures

Item characteristics. As noted in Chapter 2, the eight Ability Measures were designed to cover a broad range of abilities in a relatively short testing time. None of the measures has more than 40 items nor requires more than 20 minutes. The three shortest tests (requiring 5 minutes each in Form F) were also designed to be the most speeded. Table 3.2 presents the degree of speededness for each Ability Measure from Form F and preliminary data for the Language Usage Scale introduced in Form G. The Numerical Computation, Clerical Skills, and Space Relations scales are highly speeded as intended. The Reading Skills, Mechanical Reasoning, and Language Usage scales are essentially power tests; and the Mathematical Usage and Nonverbal Reasoning scales appear to be moderately speeded. Since several of these measures were more speeded than intended, modifications (shown in Table 3.3) were made from Form F to Form G. For Numerical Computation and Space Relations the number of items remained the same, but the time limit was increased by 20%. The time limit for Clerical Skills was also increased by 20%, but 5 items were also added. The time limits for Nonverbal Reasoning and Mechanical Reasoning were unchanged, but the length was reduced by 5 items for the former and increased by 2 items for the latter.

Table 3.4 presents the distributions of item difficulties for eight Career Planning Profile Measures. With the exception of Clerical Skills, each scale has a broad range of item difficulties, indicating the usefulness of the measures across a wide range of ability levels. Note also that the frequency of item difficulties in the intervals from 00 to 29 for Mathematical Usage suggests the items were too difficult for this particular sample.

TABLE 3.2

Degree of Speededness of Form F Ability Measures

Ability Measure	Percent of persons completing various fractions of each Ability Measure			
	1/2	3/4	9/10	Total
Reading Skills	99	92	80	72
Numerical Comp.	95	65	36	26
Math. Usage	94	71	43	42
Nonverbal Reas.	95	81	65	57
Mech. Reas.	99	97	87	79
Clerical Skills	87	51	23	17
Space Relations	83	51	26	20
Language Usage[a]	99	96	85	80

NOTE.—Based on Sample A, a 10% sample from the General Norm Group of 17,137 students (except Language Usage where N = 92).

[a]Only preliminary data based on a 36-item shortened version of this subtest.

TABLE 3.3

Time Limit and Item Number Changes in the Ability Measures from Form F to Form G

Ability Measure	Form F		Form G	
	Time (min.)	No. of Items	Time (min.)	No. of Items
Reading Skills	20	40	20	40
Numerical Comp.	5	30	6	30
Math. Usage	15	20	15	20
Nonverbal Reas.	10	40	10	35
Mech. Reas.	15	40	15	42
Clerical Skills	5	30	6	35
Space Relations	5	40	6	40

TABLE 3.4

Frequency Distributions of Item Difficulties on Form F Ability Measures

Ability Measure	00-09	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90-99	Total number of items
Reading Skills	0	0	0	4	4	6	5	8	9	4	40
Numerical Comp.	0	0	0	1	2	3	3	4	10	7	30
Math. Usage	2	6	4	3	1	2	2	0	0	0	20
Nonverbal Reas.	0	0	0	0	3	6	9	11	7	4	40
Mech. Reas.	0	0	0	2	6	5	6	9	5	7	40
Clerical Skills	0	0	0	0	0	0	0	3	20	7	30
Space Relations	0	1	1	4	1	5	7	7	12	2	40
Language Usage[a]	0	0	0	0	0	4	9	8	8	7	36

NOTE.—Based on Sample A (except for Language Usage where N = 92).

[a]Only preliminary data based on a 36-item shortened version of this subtest.

TABLE 3.5

Frequency Distributions for Point-Biserial Correlations of Individual Items with Total Scale Scores on Form F Ability Measures

Ability Measure	Correlation interval							Total number of items
	00-09	10-19	20-29	30-39	40-49	50-59	60-100	
Reading Skills	0	0	6	21	11	2	0	40
Numerical Comp.	0	3	9	4	11	3	0	30
Math. Usage	9	2	1	3	3	2	0	20
Nonverbal Reas.	0	5	7	19	6	3	0	40
Mech. Reas.	0	2	12	17	9	0	0	40
Clerical Skills	0	0	2	10	8	6	4	30
Space Relations	0	1	0	3	18	16	2	40

NOTE.—Based on Sample A.

The point-biserial correlations given in Table 3.5 summarize the relationship between the individual items and the total scores for each scale. The values reported are generally satisfactory for each scale. Careful attention will be given to the Mathematical Usage scale in the yearly revisions, however. The proportion of correlations in the intervals from 00 to 19 along with the item difficulty data indicate that a number of items may have been answered in a random fashion.

The item characteristics for the Ability Measures suggest that test-retest correlations would be appropriate for the three highly speeded tests—Numerical Computation, Clerical Skills, and Space Relations—while estimates of reliability based on internal analysis would be appropriate for Reading Skills, Mathematical Usage, Nonverbal Reasoning, Mechanical Reasoning, and Language Usage. However, these estimates may be slightly high for the Mathematical Usage and Nonverbal Reasoning scales because of their moderate speededness.

Estimates of reliability. Table 3.6 presents the standard score means and standard deviations, Kuder-Richardson Formula 20 estimates of reliability, and the standard errors of measurement for all but the three highly speeded scales. The reliabilities range from .82 to .88, which is relatively high for scales of this length.

Sample B, previously described, was used to obtain test-retest correlations for the speeded Ability Measures—Numerical Computation, Clerical Skills, and Space Relations—over approximately a 2-month time interval. Table 3.7 presents the standard score means and standard deviations for each administration, the test-retest correlation, and the corresponding standard error of measurement. The test-retest correlations ranged from .65 for Clerical Skills to .79 for Numerical Computation. The standard errors of measurement, when contrasted with those obtained for the other measures through use of internal analysis estimates of reliability, are slightly larger as expected. The means of the scales shifted upward only slightly from one administration to the next for Numerical Computation and Clerical Skills indicating a minimal practice effect. A 5-point increase in mean from one administration to the next for Space Relations indicates a

TABLE 3.6

Kuder-Richardson Formula 20 Estimates of Reliability for Five Ability Measures

Ability Measure	Mean	S.D.	S.E.M.[a]	KR-20
Reading Skills	50.1	9.9	3.7	.86
Math Usage	50.0	9.7	4.0	.83
Nonverbal Reas.	49.8	9.9	3.4	.88
Mechanical Reas.	50.0	9.9	4.2	.82
Language Usage	50.0	10.0	3.9	.85[b]

NOTE.—Based on Sample A (except Language Usage where N = 92).

[a]Standard error of measurement.

[b]Only preliminary data based on a 36-item shortened version of this subtest.

TABLE 3.7

Test-Retest Correlations over a 60-Day Interval for Three Ability Measures

Ability Measure	1st Administration		2nd Administration		r	S.E.M.[a]
	Mean	S.D.	Mean	S.D.		
Clerical Skills	50.1	10.5	51.8	10.1	.65	6.2
Numerical Comp.	49.6	9.9	51.4	10.8	.79	4.5
Space Relations	47.2	9.6	52.2	11.0	.68	5.4

NOTE.—Based on Sample B.

[a]Standard error of measurement.

considerable practice effect. Changes in the directions leading to an improved understanding of the task have been made for this scale in Form G.

Vocational Interest Profile

Since the scores from the Vocational Interest Profile are typically used to make like-sex comparisons, the reliability data are presented separately by sex for each scale. Two estimates of reliability were obtained for each scale of the Vocational Interest Profile—internal-analysis estimates and test-retest correlations. The alpha coefficient (Cronbach, 1951) was used to obtain an estimate of the internal consistency of the eight Form G Vocational Interest Profile scales. This measure reflects degree of reliability and the internal consistency among items of a scale in terms of overlapping variance and is a generalization of the Kuder-Richardson Formula 20 for dichotomous items. Table 3.8 presents the standard score means and standard deviations, the alpha coefficients, and the standard errors of measurement based on Sample A for the eight scales. For men, the alpha coefficients range from .86 to .95 and for women the range is from .85 to .93. The median alpha coefficient for both sexes is about .89. The standard errors of measurement range from 2.0 to 3.5 for men and from 2.5 to 3.6 for women with a median of about 3.0 for both. These alpha coefficients and standard errors of measurement suggest highly useful scales for career planning by individuals.

Measures of vocational interests, to be useful to students, counselors, and educators, must be stable over at least relatively short time intervals. The standard score means and standard deviations for each administration, the test-retest correlations, and the standard errors of measurement for each of the eight Form G Vocational Interest Profile scales are presented in Table 3.9. These data were based on Sample B.

TABLE 3.8

Coefficient Alpha Estimates of Reliability for Eight Vocational Interest Profile Scales

VIP Scale	Men				Women			
	Mean	S.D.	Alpha[a]	S.E.M.[b]	Mean	S.D.	Alpha[a]	S.E.M.[b]
Science	52.8	9.6	.91	2.9	45.8	9.3	.88	3.2
Health	46.7	8.5	.92	2.4	55.2	10.0	.93	2.6
Arts	47.5	9.3	.86	3.5	54.1	9.2	.85	3.6
Social Service	46.4	9.2	.88	3.2	56.1	8.3	.88	2.9
Business Contact	49.3	10.0	.88	3.5	51.7	10.0	.87	3.6
Business Detail	48.1	9.0	.88	3.1	53.9	10.2	.89	3.4
Trades	55.8	7.5	.91	2.2	41.3	8.2	.90	2.6
Technical	54.8	8.9	.95	2.0	42.7	8.0	.90	2.5

NOTE.—Based on Sample A with 1,058 men and 655 women.

[a]Cronbach Alpha Coefficient.

[b]Standard error of measurement.

TABLE 3.9

Test-Retest Correlations for Eight Vocational Interest Profile Scales for over a 60-Day Interval

VIP Scale	Men						Women					
	1st Administration		2nd Administration		r	S.E.M.	1st Administration		2nd Administration		r	S.E.M.
	Mean	S.D.	Mean	S.D.			Mean	S.D.	Mean	S.D.		
Science	51.3	9.2	52.2	9.4	.78	4.3	44.7	9.5	45.9	9.7	.83	3.9
Health	46.4	9.0	47.5	9.0	.72	4.8	54.2	10.5	55.7	10.7	.88	3.6
Arts	46.7	9.7	49.3	9.9	.79	4.4	53.9	9.9	55.3	10.4	.84	4.0
Social Service	47.8	8.3	49.6	9.2	.70	4.5	55.6	8.7	56.5	8.8	.79	4.0
Business Contact	52.0	10.3	53.2	10.4	.74	5.2	52.3	10.2	53.2	10.8	.78	4.8
Business Detail	48.9	10.2	50.7	10.2	.72	5.4	54.8	10.4	55.9	11.2	.82	4.4
Trades	55.8	7.6	57.2	8.8	.67	4.4	41.0	8.8	42.8	9.6	.75	4.4
Technical	55.4	8.6	55.9	7.5	.62	5.3	43.6	8.2	44.0	9.2	.72	4.3

NOTE.—Based on Sample B with 119 men and 195 women.

The test-retest correlations range from .62 to .79 for men and from .72 to .88 for women with a median value of .72 for men and .80 for women. The corresponding standard errors of measurement range from 4.3 to 5.4 for men and from 3.6 to 4.8 for women with a median value of 4.6 for men and 4.1 for women. These data suggest that the eight VIP scales provide sufficiently stable measures of a student's vocational interests for use in career guidance.

Career-Related Competencies

The Career-Related Competency Scales provide an index of a student's previous accomplishments in a wide range of endeavors. To be useful, these measures should be both internally consistent and stable over relatively short time intervals. As the Career Planning Profile evolved, several modifications were made in the Career-Related Competency Scales. These modifications were described in Chapter 2. Reliability data for Form G scales are currently being collected.

In Form F, students were asked to check activities which they had done or could do in a competent manner in the Skilled Trades, Home Economics, Scientific, Artistic, Social, Business, Leadership, and Clerical competency areas. Table 3.10 presents the raw score means, standard deviations, and Kuder-Richardson Formula 20 estimates of reliability for the original scales. These estimates of reliability are based on a sample of about 20,000 2-year college freshmen who participated in the norming of the ACT Guidance Profile. Generally, the scales possess moderate degrees of reliability. The test-retest correlations, based on a 3-month interval, are presented in Table 3.11. The retest analyses also show that these scales possess moderate stability. There is a general pattern of mean gain on these scales on retesting, though for most scales this gain is small relative to the standard deviation.

TABLE 3.10

Kuder-Richardson Formula 20 Estimates of Reliability for Eight Form F Career-Related Competency Scales

Competency scales	Men			Women		
	Mean	S.D.	KR-20	Mean	S.D.	KR-20
Skilled Trades	10.86	5.55	.89	1.88	2.46	.78
Home Ec.	2.27	2.01	.71	6.09	2.46	.73
Scientific	5.00	2.72	.77	4.16	2.53	.74
Artistic	2.65	2.10	.69	4.16	2.28	.66
Social	1.24	1.76	.76	2.29	2.05	.71
Business	1.78	1.61	.57	1.02	1.21	.47
Leadership	3.92	2.76	.76	4.75	2.63	.75
Clerical	2.04	1.76	.66	3.27	2.25	.73

NOTE.—Data are taken from the ACT Guidance Profile: Two-Year College Edition (1969). N = 12,345 for men and 7,968 for women.

Related Characteristics

Additional information about the characteristics of Career Planning Profile measures is provided by the intercorrelations of these measures and their correlations with other similar measures. The intercorrelations within a specific set of Career Planning Profile measures will be discussed first followed by the correlations across sets of measures. These data are presented in Table 3.12. Finally, the correlations of the Ability Measures with other similar measures will be presented.

TABLE 3.11

Test-Retest Reliabilities for Eight Form F Career-Related Competency Scales

Scales	Men					Women				
	1st Administration		2nd Administration		r	1st Administration		2nd Administration		r
	Mean	S.D.	Mean	S.D.		Mean	S.D.	Mean	S.D.	
Skilled Trades	12.31	4.87	12.65	5.13	.87	1.98	2.15	2.74	2.91	.77
Home Ec.	1.95	1.89	2.15	1.75	.78	6.92	2.08	7.36	2.03	.82
Scientific	5.05	2.80	5.42	2.72	.83	3.85	2.59	4.08	2.70	.90
Artistic	2.97	1.99	3.42	2.43	.75	4.19	1.74	4.68	2.07	.70
Social	1.97	2.17	2.26	2.60	.70	2.21	1.61	2.83	2.05	.62
Business	1.76	1.56	2.37	1.80	.67	1.17	1.40	1.60	1.42	.75
Leadership	4.87	2.76	5.34	3.09	.79	5.53	2.55	6.11	2.55	.69
Clerical	2.21	1.68	2.16	1.69	.69	3.91	2.27	4.43	2.54	.84

NOTE.—Data are taken from the ACT Guidance Profile: Two-Year College Edition (1969). N = 62 for men and 53 for women.

Intercorrelations of Career Planning Profile Measures

Table 3.12 provides the Sample A Vocational Interest Profile Scale intercorrelations for 1,058 men reported below the diagonal and 655 women reported above the diagonal. Scale intercorrelations are based on Form F items rescored according to the Form G interest dimensions. The correlations tend to support the theoretical basis of the instrument in that noncontiguous scales in the circular configuration intercorrelate to a low degree while contiguous scales intercorrelate to a much higher degree.

For the Ability Measures, 7 of the correlations for men and 12 for women are below .45, indicating that the measures are relatively independent in comparison with correlations commonly found between paper and pencil tests. Those scales with higher intercorrelations, such as Mathematical Usage and Numerical Computation, are logically related and, hence, higher correlations would be expected. The relative independence of measures is important in multiple prediction. Often correlations within a specific educational program have been found to be lower than reported here for the more heterogeneous General Norm Group, thus facilitating prediction. For example, the correlation between Mechanical Reasoning and Reading Skills for men is .53 overall. However, both variables were used in predicting grades for Auto Mechanics students, and within that group, the median intercorrelation across 22 schools was .41.

The intercorrelations of the seven Career-Related Competencies, shown in Table 3.12, are based on Form F measures equated to the Form G format. These competencies appear to be measuring rather independent dimensions of student talent. For both men and women, relatively few correlations above .35 are evident.

The correlations between sets of measures reflect several interesting patterns. Note that for both men and women, the correlations between Ability Measures and Vocational Interest Profile Scales are very low indicating these scales are measuring different aspects of human characteristics. The literature in vocational psychology has frequently noted similar results. In general, the correlations between interests and competencies are moderately high for similarly named dimensions (e.g., the Science Interest Scale and the Science Competency Scale correlate .42) but quite low for unrelated dimensions (e.g., Science Interest and Business Contact Competency Scales correlate .08). While similar patterns are found for both men and women, the relationships between like-named scales are consistently higher for men than for women.

The correlations between Ability Measures and Career-Related Competencies are near zero for most scales. Notable exceptions include the following correlations: .35 between Mechanical Reasoning and Trades and .36 between Mathematical Usage and Science for men. This pattern was not found for women.

Correlations of Ability Measures with Other Measures of Ability

The correlations of the Ability Measures with other familiar, well-researched instruments are important indicators of the properties of these Career Planning Profile scales. In this section, data will be presented which relate the Ability Measures to the General Aptitude Test Battery (GATB) and the ACT Assessment. The correlations of the seven Ability Measures and nine GATB scores for a sample based on 361 men and women are presented in Table 3.13. All of the Ability Measures correlate moderately with GATB-G (General Intelligence). As expected, Reading Skills correlates more highly with GATB-V (Verbal) than any other Ability Measure does, and Numerical Computation and Mathematical Usage correlate highly with GATB-N (Numerical). Unexpectedly, Clerical Skills correlates at the .65 level with GATB-N. However, some degree of numerical fluency is required by Clerical Skills. Both Mechanical Reasoning and Space Relations correlate about .50 with GATB-S (Spatial Aptitude). The correlation of .35 between Space Relations and GATB-P (Form Perception) suggests the two scales are measuring somewhat different dimensions. The Clerical Skills Scale and GATB-Q (Clerical Perception) appear to be measuring somewhat similar dimensions as indicated by the correlation of .49. The GATB dexterity measures (K, F, and M) have low correlations with all of the Ability Measures.

Table 3.14 presents the correlations between the Ability Measures of the Career Planning Profile and tests from the ACT Assessment. As expected, Reading Skills correlates most highly with the English test and the two ACT reading tests (Social Studies and Natural Sciences), and thus seems to be appropriately measuring important aspects of academic ability. Mathematical Usage and Numerical Computation correlate most highly with the ACT Mathematics test. And, not surprisingly, Clerical Skills, Space Relations, and Nonverbal Reasoning have consistently lower correlations with tests from the ACT Assessment than do the more academically oriented Ability Measures.

The correlations of the Ability Measures with the ACT Composite have particular relevance for guidance applications. If the Ability Measures of the Career Planning Profile are highly related to the ACT Composite, these measures may be used to estimate the ACT Composite score for students taking the Career Planning Profile. Table 3.14 indicates that at least three measures—Reading Skills, Numerical Computation, and Mathematical Usage—are highly correlated with the ACT Composite. The multiple correlation of these three measures with the ACT Composite is .78—a substantial and useful level of relationship (adding the remaining four Ability Measures only increases the multiple correlation to .79). Because of the above relationship, it is possible to provide an estimate of the ACT Composite on the Career Planning Profile Student Report in terms of a standard error of estimate band. The midpoint of this band is related to quartile ranking at 2-year and 4-year post-high school institutions.

TABLE 3.12

Intercorrelations for Vocational Interest Profile Scales, Ability Measures, and Career-Related Competency Scales

Scales	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
VIP																						
1. Science	--	.56	.37	.29	.16	.14	.49	.56	.05	.00	−.06	−.02	.07	−.01	−.03	.14	.37	.38	.12	.16	.10	−.02
2. Health	.59	--	.27	.43	.05	−.05	.16	.13	.04	−.02	.03	.02	.04	−.02	.05	.14	.35	.34	.19	.20	.06	.00
3. Arts	.40	.54	--	.51	.41	.14	.28	.30	.04	.08	−.07	−.02	.06	.04	.11	.03	.20	.26	.50	.26	.17	.06
4. Social Service	.33	.64	.60	--	.47	.17	.13	.13	−.08	.00	−.02	−.04	.00	−.09	.03	.01	.16	.21	.28	.32	.18	.09
5. Business Contact	.30	.49	.51	.64	--	.57	.19	.34	−.17	−.10	−.02	−.07	−.10	−.09	−.15	−.06	−.09	−.03	.11	.11	.16	.20
6. Business Detail	.31	.42	.40	.49	.63	--	.19	.37	−.14	−.05	.08	.08	−.02	−.02	−.08	−.07	−.13	−.09	−.06	−.05	.09	.33
7. Trades	.32	.08	.04	.03	.01	.06	--	.75	.07	.00	−.04	−.04	.06	.07	.00	.19	.18	.13	.03	.04	.00	−.03
8. Technical	.67	.32	.22	.16	.20	.25	.45	--	.00	−.03	−.07	−.06	.02	.02	−.08	.12	.12	.10	−.02	−.02	.00	.00
Abilities																						
9. Mech. Reas.	.15	−.11	−.11	−.21	−.21	−.17	.16	.12	--	.50	.34	.33	.47	.51	.55	.05	.21	.20	.11	.08	.06	.02
10. Nonverbal Reas.	.11	−.05	−.01	−.11	−.09	−.07	.06	.08	.45	--	.40	.37	.44	.50	.48	.04	.14	.12	.14	.06	.02	.04
11. Clerical Skills	.06	−.06	−.06	−.11	−.04	.00	.00	.06	.35	.40	--	.52	.30	.43	.43	.00	.11	.06	.06	.06	.00	.24
12. Numerical Comp.	.11	−.03	−.09	−.09	−.03	.00	−.01	.09	.39	.45	.59	--	.49	.35	.44	−.04	.14	.16	.05	.06	.03	.15
13. Math. Usage	.19	−.02	−.07	−.10	−.06	.00	.04	.16	.52	.47	.42	.63	--	.42	.55	−.01	.19	.21	.05	.05	.09	.04
14. Space Relations	.08	−.10	−.06	−.15	−.12	−.10	.11	.07	.48	.53	.49	.46	.46	--	.43	.02	.12	.11	.11	−.04	−.04	.13
15. Reading Skills	.19	.03	−.02	−.06	−.11	−.09	.04	.10	.53	.41	.42	.50	.60	.42	--	−.01	.19	.21	.16	.04	.08	.11
Competencies																						
16. Trades	.16	−.06	−.09	−.13	−.11	−.08	.41	.23	.34	.16	.10	.07	.18	.21	.14	--	.71	.19	.19	.20	.16	.12
17. Technical	.35	.10	.05	−.04	−.04	−.02	.35	.33	.38	.24	.12	.16	.32	.24	.25	.85	--	.82	.36	.34	.24	.14
18. Science	.42	.24	.19	.09	.08	.06	.13	.29	.27	.24	.11	.23	.36	.19	.27	.33	.77	--	.31	.31	.21	.10
19. Arts	.08	.17	.43	.23	.22	.08	−.01	.07	−.01	.05	.05	.03	.05	.06	.03	.16	.26	.30	--	.42	.30	.18
20. Social Service	.12	.21	.22	.35	.30	.18	.04	.08	−.05	.03	−.01	−.02	.05	.02	−.04	.15	.24	.25	.38	--	.36	.18
21. Business Contact	.08	.10	.10	.14	.21	.12	.08	.06	.07	.08	.09	.07	.11	.09	.02	.30	.33	.26	.32	.42	--	.21
22. Business Detail	.14	.14	.14	.19	.27	.29	−.02	.10	.05	.07	.20	.14	.15	.08	.10	.20	.30	.29	.34	.36	.47	--
Males																						
Mean	52.8	46.7	47.5	46.4	49.3	48.1	55.8	54.8	53.5	49.7	49.4	49.6	51.1	52.0	49.9	11.3	18.2	4.0	3.2	2.5	4.9	3.7
S.D.	9.6	8.5	9.3	9.2	10.0	9.0	7.5	8.9	9.6	9.8	10.2	10.1	9.8	10.0	9.7	5.0	7.4	2.4	2.8	2.6	2.6	2.8
Females																						
Mean	45.8	55.2	54.1	56.1	51.7	53.9	41.3	42.7	44.2	49.9	51.4	50.2	47.9	47.0	50.4	2.3	8.0	3.4	5.3	4.2	3.7	5.5
S.D.	9.3	10.0	9.2	8.3	10.0	10.2	8.2	8.0	8.0	10.1	10.6	9.9	10.0	9.6	10.2	3.3	5.4	2.3	3.0	2.9	2.5	3.4

NOTE.—Based on Sample A with 1,058 males reported below the diagonal and 655 females reported above the diagonal.

TABLE 3.13

Correlation of Ability Measures with General Aptitude Test Battery Measures

Ability Measures	General Aptitude Test Battery Measures								
	G	V	N	S	P	Q	K	F	M
Reading Skills	.63	.61	.52	.25	.16	.19	.16	.09	.04
Numerical Comp.	.61	.43	.72	.25	.37	.38	.21	.21	.12
Math. Usage	.64	.38	.58	.40	.22	.15	.06	.14	.15
Nonverbal Reas.	.41	.27	.35	.38	.40	.25	.28	.21	.18
Mech. Reas.	.55	.26	.31	.50	.14	-.03	.00	.09	.17
Clerical Skills	.55	.40	.65	.21	.47	.49	.38	.32	.21
Space Relations	.59	.30	.44	.51	.35	.20	.12	.24	.20

NOTE.—Based on 361 students from a single institution using Form F.

TABLE 3.14

Correlations of Ability Measures with Tests from the ACT Assessment

Ability Measures	ACT Assessment Scales				
	English	Mathematics	Social Studies	Natural Sciences	Composite
Reading Skills	.59	.45	.62	.60	.70
Numerical Comp.	.42	.54	.34	.36	.52
Math. Usage	.40	.66	.45	.51	.63
Nonverbal Reas.	.35	.39	.34	.39	.46
Mech. Reas.	.18	.42	.36	.46	.45
Clerical Skills	.36	.28	.24	.25	.35
Space Relations	.24	.40	.30	.38	.41

NOTE.—Based on 3,263 students from 43 2-year institutions.

Spatial Configuration of the Vocational Interest Profile

As noted in Chapter 2, the scales of the Vocational Interest Profile were constructed to conform to the circular configuration of vocational interests suggested by Roe (1956) and Holland, Whitney, Cole, and Richards (1969). Hence, the degree to which the scales of the Vocational Interest Profile approximate this circular configuration represents the degree to which they are measuring the important hypothesized constructs of vocational interest. An analysis of spatial configuration was used to examine the extent to which the scales of the Vocational Interest Profile conform to this circular patterning of interests.

Spatial configuration analysis (Cole & Cole, 1970) shows the interrelationships of variables, obtained from a correlation matrix, in a simple two-dimensional plane. Thus, the complex interrelationships between many variables may be better understood by examining the distances between variables on the plane. Variables showing a high degree of relationship fall close together on the plane, and variables with a low degree of relationship fall farther apart. This type of analysis has been used to show a common pattern of interrelationships within scales of the Strong Vocational Interest Blank, the Minnesota Vocational Interest Inventory, the Vocational Preference Inventory, and the Kuder Occupational Interest Survey (Cole & Hanson, 1971).

Another advantage of the spatial configuration analysis is that mean profiles of various groups may be superimposed on the same planar configuration. In the case of vocational interest measurement, one would expect students entering health-related educational programs to have health-related interests. If the measuring instrument was, in fact, measuring health-related interests, then the mean profile of that group should reflect those interests and fall near the health scale on the plane. Hence, the spatial configuration analysis provides a method of illustrating the construct validity of an instrument in an easily understood fashion.

Figure 3.1 gives the spatial configuration of the Vocational Interest Profile for the 1,058 men in Sample A. The pattern of the eight interest scales generally conforms to the hypothesized circular configuration. The contiguity of the Social Service and Arts Scales probably indicates the similarity of the items comprising these scales (typically female oriented) when viewed from a male perspective. Men frequently answer in the "dislike" direction on these types of items. Figure 3.1 also shows the relative positions of the mean group profiles for the 11 educational program clusters described in Chapter 2. In general, they fall near the appropriate interest scales. Some exceptions do occur, however. The Technical—Agriculture Production cluster has a stronger orientation toward trades-related interests than technical- or science-related interests as evidenced by the relatively closer position to the Vocational Interest Profile Trades Scale than to the Technical or Science Scales.

Figure 3.2 gives the spatial configuration of the Vocational Interest Profile Scales for the 655 women in Sample A. Again, the pattern for the eight scales generally conforms to the hypothesized circular configuration. However, the Trades and Technical Scales fall close together and appear in reverse order from the predicted configuration. This reversal is probably a function of women viewing traditionally masculine activities as very similar and not making fine discriminations among them.

Generally, the Program Clusters for women also fall where expected on the planar configuration. Note, however, that female vocational-technical students entering the health-related fields have clearly defined Health interests (i.e., they fall closer to the Vocational Interest Profile Health Scale than to any other scale), while female students entering transfer programs in Natural Science and Health fall nearer the Science Scale than the Health Scale. The emphasis of science-related coursework in the latter Program Cluster provides a logical explanation of this result.

These analyses provide evidence that the Vocational Interest Profile scale structure is, in general, congruent with the circular configuration of interests proposed by Roe and

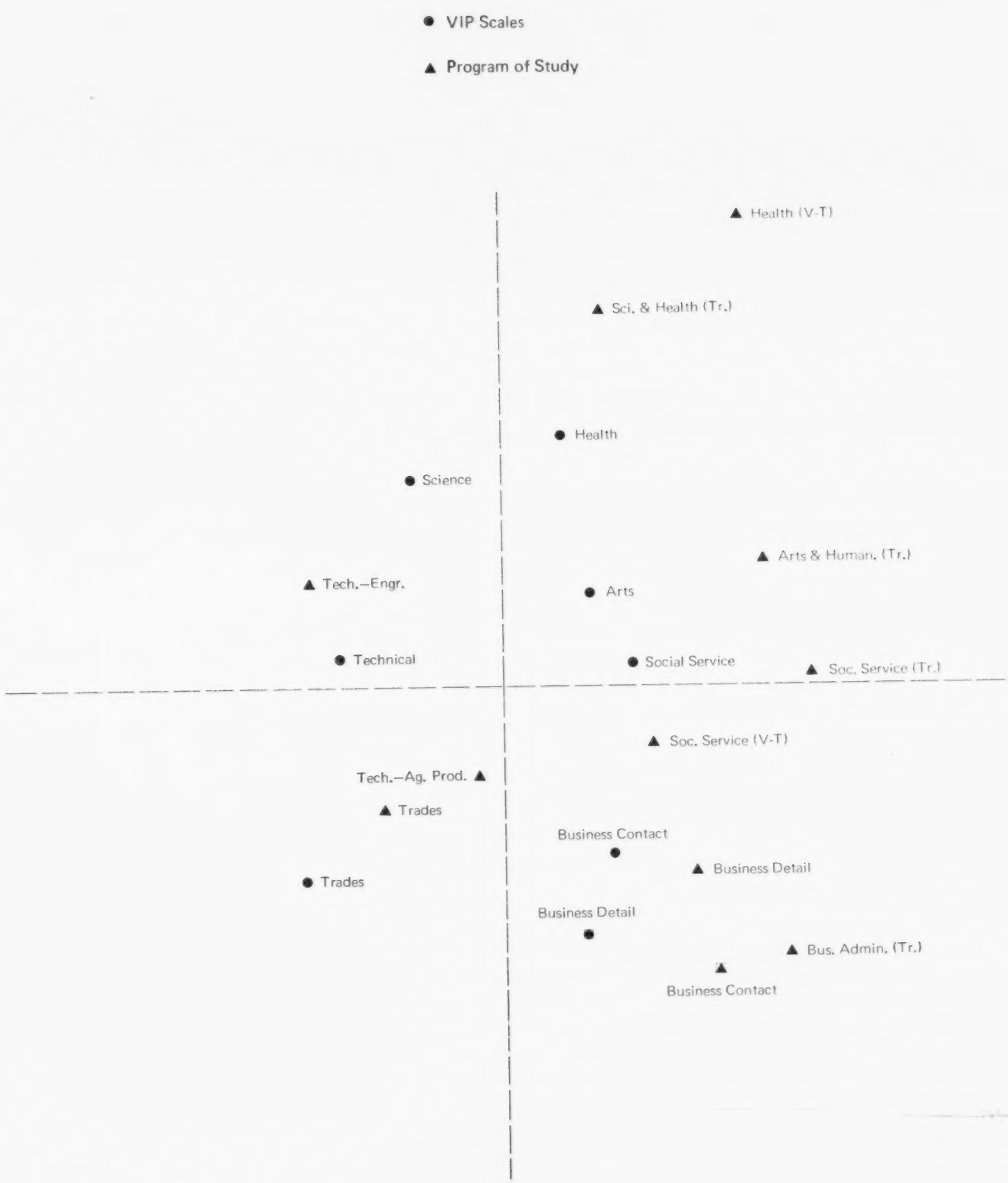


Fig. 3.1. Spatial configuration of Vocational Interest Profile Scales and means of program clusters for men.

Holland et al. and identified in other interest inventories. Also, the mean group profiles of selected educational program clusters generally fall near the appropriate Vocational Interest Profile Scales providing additional evidence of the construct validity of the instrument. This type of evidence, when evaluated in conjunction with other information about the Vocational Interest Profile, suggests this new interest inventory is measuring theoretically important dimensions of vocational interests.

Fig. 3.2. Spatial configuration of Vocational Interest Profile Scales and means of program clusters for women.

CHAPTER 4

VALIDITY OF THE CAREER PLANNING PROFILE FOR CAREER GUIDANCE: PREDICTION OF PERFORMANCE

Several types of validity evidence are relevant to assessing the usefulness of tests and inventories in career guidance. Some of this evidence has already been presented for the Career Planning Profile. The rationale for specific scales and the content of these scales were described in Chapter 2. Chapter 3 reported the results of configural analyses of Career Planning Profile scales and the correlation of selected scales with other commonly used measures. Evidence of the criterion-related validity of Career Planning Profile scales is provided in this chapter and the next. Two types of criterion-related validity evidence are presented:

1. The effectiveness of the Career Planning Profile Ability Scales in predicting the performance of students enrolled in various vocational, technical, and transfer programs (this chapter).

2. The ability of Career Planning Profile measures to produce expected differences among "successful and satisfied" students enrolled in each of these programs (Chapter 5).

In many ways, predictive validity, as described in Item 1, represents the ultimate objective of the other types of validity noted above. For it is possible to base tests on a sound rationale, to choose appropriate content, and to achieve desired relationships among scales without having scales which relate in useful ways to the real world of education and work.

There are two crucial aspects of a test's relationship to real-world criteria. First, there is the question of *whether* a test is related in a useful and sensible way to these criteria. The scores of more than 17,500 students who had taken the Career Planning Profile were involved in the study of this relationship. The real-world criteria which were used, while intermediate rather than ultimate, are directly relevant to the career guidance of youth. Among these criteria were the educational program choices made by students and their success and satisfaction in these programs. Additional criterion data will be obtained after the students enter employment.

Once the relationships between a test and real-world criteria have been established, there is the task of applying data on these relationships to the transformation of test *scores* into *information* that is readily usable by counselors and counselees. Evidence of a test's validity for its intended purpose is crucial. But as any counselor knows, a multiple correlation coefficient or a Wilks' Lambda is not very useful in the guidance office or the student personnel center. Two procedures for using criterion-related validity data in transforming test scores into career guidance information were employed in the Career Planning Program, i.e., Bayesian *m*-group regression analysis and centour scores based on discriminant analysis. Both procedures are being used for the first time in a nationwide testing program. The end products of these procedures appear in the "Educational Planning Summary" section of the Student Report in the form of "Chances of 'C' Average or Higher" and "Exploration Priorities." The "Exploration Priorities" suggest educational programs that students might want to explore. "Chances of 'C' Average or Higher, " on the other hand, represent predictions of future performance in specific educational programs.

All of the various types of validity data noted above should contribute to the reader's evaluation of the construct validity of Career Planning Profile scales and the usefulness of the information on the Student Report. Additional validity data will be published in the *ACT Research Report*, the *ACT Technical Bulletin* series, and subsequent revisions of this *Handbook*. Through participation in the free research services which are part of the Career Planning Program, users can obtain validity data specific to their own institutions.

Relationship between Ability Scales and Course Performance

Estimates of future performance in educational programs are important considerations for students in formulating educational and vocational plans. For this reason, Ability Measures from the Career Planning Profile are used to predict performance in a wide range of postsecondary career education programs. In this chapter we examine the degree to which these measures are valid predictors of grades in these programs.

Design of Analyses

In the 1972 testing year, grade estimates will be provided for 18 of the 22 educational programs listed in the Educational Planning Summary section of the Student Report. Grade estimates will also be provided for the General Studies (Core) courses taken by vocational and technical students. The students on whom the initial predictions were based were part of the fall 1970 norming sample described in Chapter 2. Data on first-term grades were collected on approximately 16,700 of these students in 1971 and those grades served as the criteria for the Career Planning Program predictions.

Grade point averages (GPA) were collected for vocational-technical courses and for core academic (or general studies) courses. For the 16 vocational-technical programs examined, the criterion was GPA in first-term vocational-technical

courses exclusive of academic courses. For the two academic transfer programs, the criterion predicted was overall GPA. Although first-term GPA cannot be considered the ultimate criterion, it is related to final program success, especially in programs of 2 years' duration or less. In addition, first-term performance is often of great concern to students in making educational plans.

The Career Planning Program Prediction System

Prediction of performance in vocational-technical education is by no means a simple problem. Because sample sizes available for a particular program in a single institution are often quite small, the usual least-squares regression estimates are subject to serious sampling variability. However, there is such diversity across programs within an institution that pooling across programs is completely unsatisfactory. Ghiselli (1966) and Prediger, Waple, and Nusbaum (1968) have indicated the diversity in the predictor variables which were most effective in different vocational-technical programs. Even like-named career education programs across institutions are often more diverse than academic programs. Consequently, some method of providing predictions for small groups through use of collateral information from similar groups as well as the unique information for the specific group is necessary.

The Career Planning Program prediction system uses a Bayesian procedure developed by Jackson, Novick, and Thayer (1972) and further described and validated by Novick, Jackson, Thayer, and Cole (1972). The system provides for simultaneous estimation of prediction weights for like-named programs in different institutions. The Bayesian method allows for differences in program content and grading standards across institutions but uses the information from similar programs to improve the prediction in programs for which few data are available. A thorough description of the process by which the prediction weights were obtained for the Career Planning Program is given in Novick, Jones, and Cole (1972), and technical details on implementing Bayesian predictions are given by Jones and Novick (1972). The educational philosophy underlying these methods is described by Novick and Jackson (1970) and the mathematical theory by Lindley and Smith (1972). In the following section the effectiveness of the predictions achieved in the Career Planning Program is examined.

Results

Zero-order correlations. Prior to application of the Bayesian procedures cited above, the zero-order correlations of the seven Career Planning Profile Ability Measures with the grade criteria were obtained. For each educational program, correlations are reported in Table 4.1 for the 3 institutions with the most students in that program. The data in Table 4.1 come from 26 different institutions across the nation.

Because the programs are generally small, the correlations in Table 4.1 show considerable fluctuation. Nevertheless, trends in the correlations across programs are discernible. Generally, the Ability Measures do better in programs for which their content is consistent with the content of the program. For example, the quantitative predictors are relatively better in science and technical fields; Mechanical Reasoning is better in trades fields; and Reading is related to grades in most fields. Numerical Computation, Mathematics Usage, and Reading Skills are most frequently the best predictors, followed by Clerical Skills and Mechanical Reasoning. Space Relations and Nonverbal Reasoning are of lesser value for most programs although each is an effective predictor in at least 1 of the 19 programs (e.g., Space Relations for Drafting and Machine Work, Nonverbal Reasoning for Computer Programming and Secretarial Science). Although many of the individual correlations are not very high, the variables can yield quite effective multiple prediction because of their relative independence.

Multiple correlations. The first step in applying the Bayesian methodology in the Career Planning Program prediction system was the selection of predictor variables. Because of the small samples involved, the use of only a small number of predictors was desirable in order to enhance stability of the prediction equations upon cross validation. Consequently, no more than three variables were used as predictors for a single program. The particular variables for any one program were selected on the basis of their logical relation to the program and empirical indications that the variables were related to programs of that type at several institutions. The relative independence of the variables within the program was also a consideration.

Table 4.2 gives the variables selected for each program in which predictions were made in 1972. The variables selected for each field were generally the variables one would expect to be related to grades in that field. For example, Mechanical Reasoning and Numerical Computation were used for Machine Work, while Clerical Skills and Mathematics Usage were selected for Computer Programming. Five of the seven Ability Measures were used in the Bayesian prediction equations. The fact that no single set of two or three predictors was chosen for all programs supports the appropriateness of the diversity of the Career Planning Program Ability Measures.

The multiple correlations of the selected predictor variables with the grade criteria were computed for schools with samples greater than 15 for each program. Table 4.2 gives the median and range of the multiple correlations for each program over a number of institutions. In addition, a Bayesian estimate of the multiple correlation (Novick, Jones, & Cole, 1972) which simultaneously uses the information from all the institutions in a program is given in Table 4.3. The estimated multiple correlations range from .33 to .66. Because the prediction equations do not capitalize on chance variation unique to a single sample but are constructed using variables and regression weights derived from information on numerous samples, the Bayesian estimates of the multiple correlations will not be subject to the usual amount of shrinkage (Novick, Jackson, Thayer, & Cole, 1972). Instead, the values given in Table 4.3 give an indication of the level of correlation to be expected on cross validation. Multiple correlations of this magnitude compare very favorably with values historically obtained in predicting success in job training and vocational-

TABLE 4.1

Correlations of Career Planning Profile Ability Measures with First-Term Grades

Educational program area	Institution	N	Mech. Reas.	Nonv. Reas.	Cler. Skills	Num. Comp.	Math. Usage	Space Rel.	Read. Skills
Auto Mechanics	1	174	.28	.22	.38	.40	.36	.18	.43
	2	96	.43	.06	.09	.24	.26	−.01	.25
	3	64	.48	.25	.29	.33	.27	.32	.33
Drafting	4	74	.41	.19	.38	.21	.30	.33	.41
	5	68	.39	.31	.27	.41	.39	.38	.31
	1	62	.26	.26	.42	.52	.48	.18	.36
Machine Work	1	27	.19	.26	.38	.26	.43	.45	.54
	3	24	.21	.47	.02	.60	.15	.20	.20
	6	19	.62	.11	.60	.21	.41	.46	.20
Other Trades	1	194	.33	.28	.22	.29	.41	.17	.41
	2	167	.31	.09	.26	.34	.38	.16	.33
	7	138	.18	.12	.15	.11	.14	.26	.19
Elect. Engr. Tech.	1	72	.22	.39	.23	.57	.45	.13	.28
	2	70	.26	−.02	.32	.41	.39	.23	.25
	7	65	.48	.35	.44	.41	.52	.48	.60
Other Technical	8	41	−.03	.18	.14	−.12	.24	.23	.03
	2	35	.22	.15	.18	.45	.57	.04	.05
	9	33	.18	.20	.18	−.02	.21	.10	.35
Science (Transfer)	10	58	−.10	−.23	.13	.10	.01	−.09	−.06
	11	40	.12	.16	.06	.06	.23	−.08	.29
	12	32	.13	.03	−.06	.25	.37	.18	.43
Dental Assisting	13	45	.33	−.05	.30	.33	.41	.26	.67
	2	42	.09	−.02	.49	.57	.25	.16	.41
	14	40	.55	.45	.60	.59	.55	.56	.72
Nursing—Pract.	7	59	.28	.24	.26	.34	.30	.36	.55
	13	57	.34	.19	.40	.34	.25	.22	.32
	15	51	.26	.39	.50	.34	.50	.26	.60
Nursing—Regist.	16	62	.13	−.07	.05	.19	.23	−.14	.29
	17	55	.18	.15	.64	.22	.03	.08	.52
	18	53	.34	.34	.38	.12	.38	.24	.57
Other Health	13	90	.21	.19	−.02	.28	.40	.19	.28
	19	89	.21	.09	.05	.23	.27	.06	.32
	16	62	.18	.09	−.12	−.02	.11	.07	.35
Police Science	20	51	.35	.41	.33	.34	.49	.16	.40
	21	36	.16	−.19	.15	.19	.11	.02	.14
	22	26	.38	.18	−.05	.15	.44	.16	.18
Bus. & Marketing	11	36	.24	.01	.08	−.10	.03	.14	.26
	23	21	.36	.04	.42	.52	.49	.66	.57
	24	20	.35	.53	.65	.66	.62	.48	.67
Bus. Admin. (Transfer)	10	66	.09	−.02	.21	.20	.16	.06	.08
	20	53	.20	.10	.21	.22	.09	.24	.12
	6	32	.01	.20	.19	.33	.35	.16	.31

[Continued]

Table 4.1 *[Continued]*

Educational program area	Institution	N	Mech. Reas.	Nonv. Reas.	Cler. Skills	Num. Comp.	Math. Usage	Space Rel.	Read. Skills
Accounting	7	36	.19	.12	.31	.38	.47	.32	.26
	9	33	−.10	.16	.37	.40	.34	.16	.27
	10	32	.34	.38	.44	.49	.28	.38	.63
Computer Prog.	1	55	.34	.45	.52	.60	.50	.44	.32
	2	40	.18	.27	.22	.49	.44	.11	.51
	8	37	.11	.12	.18	.36	.31	.17	.18
Data Processing	22	50	.39	.24	.42	.43	.61	.43	.61
	4	37	.54	.21	.34	.28	.48	.24	.51
	25	35	.54	.14	.66	.65	.66	.39	.52
Secretarial Sci.	26	64	.20	.48	.42	.58	.61	.25	.52
	1	51	.24	.40	.50	.44	.27	.27	.42
	20	49	.25	.31	.24	.28	.32	.14	.47
General Studies[a]	7	454	.17	.27	.31	.39	.40	.22	.42
	8	243	−.21	.13	.18	.27	.22	.08	.24
	16	226	.20	.22	.21	.30	.34	.19	.47

[a]High school GPA was also used as a predictor of general studies grades. Correlations for the institutions listed were .41, .32, and .36.

TABLE 4.2

Multiple Correlations of Selected Career Planning Profile Predictors with Grades

Educational program area	Number of institutions	Number of students	Predictor variables[a]	Multiple correlations	
				Range	Median
Auto Mechanics	20	764	MR, NC, RS	.20-.75	.50
Drafting	17	311	MR, NC, RS	.28-.58	.53
Machine Work	10	163	MR, NC	.17-.85	.63
Other Trades	18	1,248	MR, NC, RS	.11-.64	.40
Elect. Engr. Tech.	16	644	MR, MU, RS	.28-.70	.45
Other Technical	8	220	MU	.16-.60	.40
Science (Transfer)	5	170	MU, RS	.07-.67	.48
Dental Assisting	10	282	NC, RS	.29-.74	.60
Nursing—Pract.	9	336	NC, RS	.39-.73	.56
Nursing—Regist.	16	557	NC, RS	.09-.67	.30
Other Health	9	443	NC, RS	.25-.74	.46
Police Science	8	209	MR, RS	.17-.73	.42
Bus. & Marketing	7	146	NC, RS	.30-.94	.65
Bus. Admin. (Transfer)	9	272	NC, RS	.20-.70	.38
Accounting	8	216	NC, RS	.14-.81	.43
Computer Prog.	5	175	CS, MU	.35-.62	.50
Data Processing	9	251	NC, RS	.13-.71	.53
Secretarial Sci.	26	914	NC, RS	.14-.76	.45
General Studies	41	3,984	NC, RS, HS	.26-.81	.45

[a]MR = Mechanical Reasoning
CS = Clerical Skills
NC = Numerical Computation
MU = Mathematics Usage
RS = Reading Skills
HS = High School GPA

technical programs and even compare favorably with the multiple correlations commonly found for predictions in academic programs.

Also given in Table 4.3 are the generalized Bayesian regression coefficients for each of the 18 specific educational programs. These weights are used to provide students with general estimates of success without reference to a single, specific institution.

An example of the Bayesian regression coefficients for a specific program, Data Processing, and the 18 institutions with 10 or more students in that program is given in Table 4.4. The least-squares regression coefficients can be compared with the Bayesian regression coefficients in Table 4.4. When the samples are very small, note that the Bayesian coefficients approximate the generalized coefficients in Table 4.3. Note also that negative least-square coefficients emerge as positive through the Bayesian procedure.

Prediction of Course Performance

While the results noted above indicate the potential usefulness of Career Planning Profile Ability Measures in predicting grades in educational programs, additional steps must be taken to provide useful information for counselors and students. In the case of the Bayesian prediction system, multiple regression equations are used to obtain predicted grades for each student in each of the 18 educational programs. However, a grade prediction alone does not convey the idea of error in prediction to students and counselors. Hence, an additional transformation of the test data must be made. One possibility, an error band around a prediction, is often difficult to explain to students. Instead, the grade predictions for a student are converted to chances in 10 of obtaining a "C" average or higher, a form of the information which both conveys the idea of a probabilistic statement and at the same time is very easy for a user to understand.

To further simplify interpretations and to eliminate a myriad of numbers from the Student Report, the chances in 10 of obtaining a "C" average or higher are converted to HIGH (7 or more), MED (4 to 6), or LOW (3 or less). Thus, the student and counselor get a verbal report of the student's probable success in the 18 diverse educational programs.

It must be noted that the proper interpretation of the predictions contained in the Career Planning Profile Student Report will require precision and care. The predictions of success will be good predictions for typical examinees, or randomly sampled examinees, from the program in question. However, all predictions are based on data from groups in which there has been much self-selection on variables not included in the prediction equation. Consequently, the following statement is included on the Student Report: *"Caution:* When a student is unlike other students entering an educational program, grade estimates for that program should be used with caution. For example, care should be used in interpreting grade estimates for a student of one sex in a program in which the other sex predominates." The predictions should be used only as a base line with which additional information about the student is combined.

TABLE 4.3

Generalized Regression Coefficients for CPP Predictions of GPA by Educational Program

Educational program area	Number of institutions	Total students	$\tilde{\beta}_0$	$\tilde{\beta}_1$	$\tilde{\beta}_2$	$\tilde{\beta}_3$	$\tilde{\beta}_4$	$\tilde{\beta}_5$	$\tilde{\beta}_6$	$\tilde{\beta}_7$	Bayesian estimate of R
Auto Mechanics	20	764	.503	.014	—	—	.013	—	—	.014	.4165
Drafting	17	428	−.341	.025	—	—	.017	—	—	.012	.4470
Machine Work	10	163	−.336	.020	—	—	.037	—	—	—	.5930
Other Trades	24	1,398	.779	.016	—	—	.009	—	—	.010	.3764
Elect. Engr. Tech.	27	824	−.484	.013	—	—	—	.031	—	.012	.4463
Other Technical	19	369	.966	—	—	—	—	.031	—	—	.3738
Science (Tr.)	10	235	.526	—	—	—	—	.022	—	.011	.4525
Dental Assisting	12	307	.021	—	—	—	.019	—	—	.033	.5775
Nursing—Pract.	19	475	.611	—	—	—	.012	—	—	.034	.5126
Nursing—Regist.	18	583	.656	—	—	—	.009	—	—	.025	.3483
Other Health	16	529	.213	—	—	—	.016	—	—	.031	.5002
Police Science	8	209	.736	.013	—	—	—	—	—	.023	.4250
Bus. & Marketing	12	199	−.782	—	—	—	.026	—	—	.038	.6580
Bus. Admin. (Tr.)	12	306	.468	—	—	—	.016	—	—	.020	.3268
Accounting	14	291	.147	—	—	—	.021	—	—	.027	.5216
Computer Prog.	12	258	−.401	—	—	.020	—	.035	—	—	.4472
Data Processing	18	358	−.540	—	—	—	.025	—	—	.035	.5019
Secretarial Sci.	26	914	.148	—	—	—	.020	—	—	.029	.4646

TABLE 4.4

Regression Weights for Least-Squares and for Bayesian Values for the Data Processing Program

Institution	N	Least-squares values			Bayesian values			
		$\hat{\beta}_0$	$\hat{\beta}_4$	$\hat{\beta}_7$	$\bar{\beta}_0$	$\bar{\beta}_4$	$\bar{\beta}_7$	R
1	12	−1.825	.041	.052	−.382	.028	.034	.5082
2	12	−3.024	.096	.039	.006	.029	.032	.5015
3	14	2.698	−.012	.014	.495	.019	.025	.5016
4	18	1.774	.019	−.003	.072	.020	.027	.4977
5	12	−.694	.024	.042	−.528	.027	.036	.5081
6	15	1.020	.005	.034	−.151	.027	.032	.5028
7	19	2.558	.013	−.005	.040	.022	.028	.4979
8	10	−2.332	.020	.056	−1.144	.018	.041	.5054
9	10	−1.072	−.061	.014	−.699	.023	.039	.5034
10	10	−.677	−.004	.067	−.696	.022	.039	.5066
11	30	−2.215	.052	.042	−.881	.031	.038	.4860
12	35	−1.465	.049	.035	−.857	.035	.037	.5107
13	28	−1.173	.042	.027	−.873	.028	.036	.4966
14	50	−1.312	.017	.058	−1.004	.026	.043	.5009
15	12	−2.760	.075	.026	−.757	.028	.036	.5044
16	17	−.009	.008	.034	−.661	.020	.035	.5024
17	37	−1.275	.016	.058	−.790	.023	.041	.4935
18	17	−2.544	.042	.047	−.908	.025	.037	.5045

NOTE.—β_0 = intercept; β_4 = weight for Variable 4 (Numerical Computation); β_7 = weight for Variable 7 (Reading Skills).

CHAPTER 5

VALIDITY OF THE CAREER PLANNING PROFILE FOR CAREER GUIDANCE: DIFFERENTIATION OF EDUCATIONAL PROGRAMS

As noted in Chapter 4, a second type of criterion-related validity evidence relevant to the Career Planning Profile is its ability to differentiate among students enrolled in various vocational, technical, and transfer programs. For example, one would expect substantial differences in the interests, abilities, and working condition preferences of students enrolled in Auto Mechanics, Electrical Engineering Technology, Accounting, and Police Science programs—to name just a few. If students in these and other programs obtain similar scores on the various sections of the Career Planning Profile, serious questions about construct validity and criterion-related validity could be raised.

One approach to the study of group differences is the comparison of group profiles on a set of measures. For example, Figure 5.1 presents the ability and interest profiles for students enrolled in three broad clusters of vocational and technical programs. Cluster differences on several of the Career Planning Profile scales are substantial and in expected directions. Additional differences across program clusters can be seen in Appendix B where profiles for 11 vocational, technical, and transfer clusters are presented. Appendix B also provides cluster distributions for Career-Related Competencies, Career-Related Personal Characteristics, and high school grades in six subject areas.

Additional evidence of the ability of Career Planning Profile measures to differentiate among students enrolled in various programs was obtained in two ways: chi-square analysis of contingency table data and discriminant analysis. Because of substantial differences in the Career Planning Profile scores of men and women, separate analyses were performed for these groups. Results are summarized in the following section.

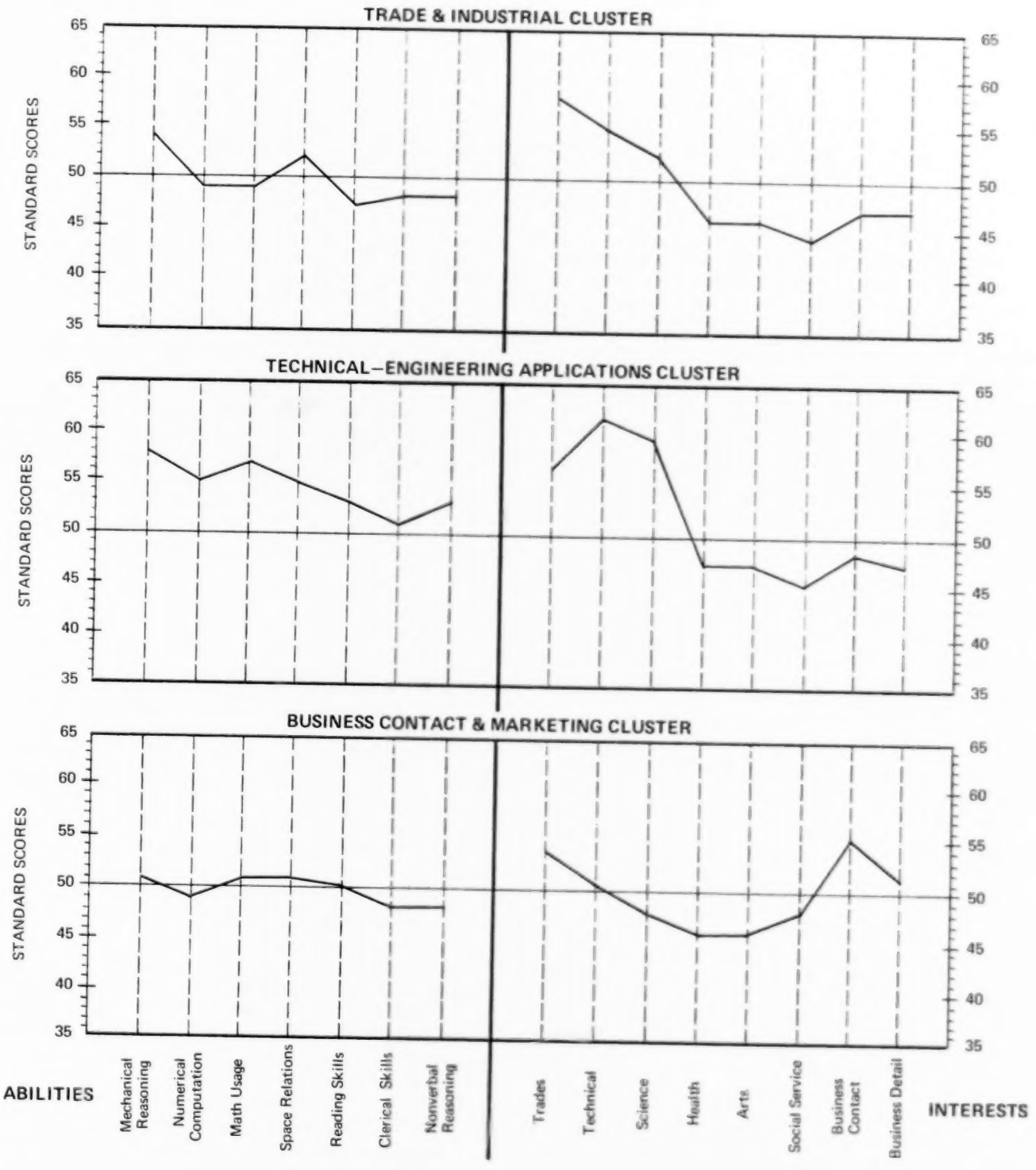
Applications of the results of the analyses of group differences to career guidance are discussed in the section on "Exploration Priorities" at the end of this chapter. It must be emphasized that differences among groups do not necessarily imply that group membership can be accurately predicted for each of the groups. Hence, the reader is urged to give special attention to the discussion of "Exploration Priorities" as indicators of a student's *similarity* to enrollees in various educational programs *rather than* as predictors of which educational program the student will enter or the degree of success he might attain in that program. Exploration Priorities are meant to encourage and facilitate exploration only.

Program Cluster Differences on Self-Report Scales

Chi-square analyses were used to determine the extent of the differences across program clusters in the responses of students to each of the 20 self-report scales used in the following sections of the Career Planning Profile: Working Condition Preferences, Career-Related Personal Characteristics, and Job Values. Each of these scales consists of one 4-choice item. The program clusters used in these analyses are described in the section on Program Cluster Norms in Chapter 2. The students involved in the analyses were chosen from the groups used in the Cluster Norms presented in Appendix B. To be included, all students had to have a post-high school, first-term GPA of 2.0 (C) or higher. Men chosen for all 11 program clusters also expressed satisfaction with their program choice at the end of the first term. Women in 5 of the clusters (Health, Social Science and Public Service, Business Detail and Office, Arts and Humanities, and Social Science and Public Service—Transfer) were also screened for satisfaction with program choice. The number of women enrolled in the other programs was too small to allow for use of this criterion. In certain of the very large programs (for men: Trade and Industrial, Technical—Engineering Applications, Business Detail and Office; for women: Health, Business Detail and Office), subsamples were randomly selected from among the "successful and satisfied" students in order to avoid large discrepancies in sample size across the clusters. The self-ratings of approximately 1,550 men and 1,200 women were involved in the chi-square analyses.

For each of 20 self-report scales noted above, a 4-by-11 contingency table (4 response categories, 11 program clusters) was formed for men and a 4-by-9 contingency table was formed for women. Chi-square analyses were performed on each of these tables. An example of the format of the contingency tables and the general form of the results from each of the analyses is provided by Table 5.1 where cluster differences for men on Mechanical Ability are shown. (Mechanical Ability is one of the scales included in Career-Related Personal Characteristics.) Inspection of the percentage distribution across clusters for the four self-ratings categories reveals substantial differences for some clusters. For example, only 2% of the men in the Trades and Industrial area rate themselves as below average on Mechanical Ability. The corresponding figure for Arts and Humanities students is 23%. Only 5% of these students rate themselves in the top 10% of their peers, as compared with 16% for the Trade and Industrial students.

The chi-square value for the entire contingency table is shown in the last row. The portion of this chi-square value associated with each cluster (row of table) is shown in the right-hand column of the table. This "row-square contingency technique" for partitioning an overall chi-square into its component parts has been suggested by Guilford (1956). In



NOTE.–Standard scores (Mean = 50 and S.D. = 10) are based on men and women in the general norm group. See Appendix B for additional profiles.

Fig. 5.1. Differences in profile medians for men enrolled in selected program clusters.

the contingency table analyses, it was used to identify the relative contribution of the various clusters to the overall chi-square.

Similar analyses were conducted for the other self-report scales. Tables 5.2 and 5.3 provide summaries of these analyses. Items for which responses differed across clusters were identified by comparing the overall chi-square for each item with the 99th percentile point of the appropriate chi-square distribution. This screening point was used to avoid identifying items which differentiated clusters only as the result of random variation. The chi-square values for 24 of the 40 analyses exceeded the screening point. Eleven of the 16 analyses that failed to exceed the screening point involved Job Value Scales. Hence, results for the 12 analyses performed on these scales have been omitted from Tables 5.2 and 5.3.

For items with overall chi-squares exceeding the screening point defined above, the component chi-squares associated with each of the program clusters were inspected. Response trends were then determined for the clusters meeting the cutoff described in the footnotes for Tables 5.2 and 5.3. These response trends are summarized in Tables 5.2 and 5.3.

In general, the results of the contingency table analyses show that Career Planning Profile self-report items are useful in differentiating among successful and satisfied students enrolled in a broad range of vocational, technical, and transfer programs. Item response trends for the clusters are in the expected direction. In addition, each cluster has a unique pattern of responses which differentiates it from the other clusters. Inspection of the row entries in Tables 5.2 and 5.3 reveals the response trends which are typical of students enrolled in each cluster. Knowledge of these trends should be useful in helping students explore educational program possibilities.

Educational Program Differences on Selected Scales

The contingency table analyses reported in the previous section were limited to single-item self-report scales and considered cluster differences on one scale at a time. This section reports the extent and nature of educational program differentiation for a variety of Career Planning Profile measures when used together. Educational program differences

TABLE 5.1

Differences on Self-Estimates of Mechanical Ability for Men Grouped by Program Cluster (Example of Contingency Table)

Program cluster	Percentage distribution of self-estimates				N for rows	χ^2 sum for row[a]
	Below average	Average	Above average	Top 10%		
VOCATIONAL–TECHNICAL PROGRAMS						
Trades	2%	29%	53%	16%	365	43.5
Tech.–Ag. Prod.	5	40	44	11	174	1.8
Tech.–Engr.	2	29	53	16	246	27.3
Health	20	38	31	11	74	16.9
Soc. Service	9	45	39	7	126	3.8
Business Contact	10	43	36	11	136	2.5
Business Detail	10	52	33	5	214	23.7
TRANSFER PROGRAMS						
Sci.–Health	18	40	29	13	38	7.2
Arts & Human.	23	40	33	5	43	15.8
Soc. Science	17	50	25	8	48	10.1
Bus. Admin.	16	49	26	8	87	16.1
N for columns	121	601	652	177		
Overall χ^2						168.7

NOTE.–Self-estimates are in comparison with persons of same age as responder. The overall χ^2 was obtained from a standard 4-by-11 contingency table analysis.

[a]Sum of χ^2 values obtained for the four cells in the row.

TABLE 5.2

Differences on Single-Item Self-Report Scales for Students Grouped by Program Cluster: Men

Program cluster	N[a]	Working Condition Preferences: Indoor/ Outdoor	Others/ Alone	Varied/ Routine	Phys./ Nonphys.	Career-Related Personal Characteristics: Acad. Motiv.	Work Motiv.	Art. Abil.	Cler. Abil.	Engl. Abil.	Math. Abil.	Mech. Abil.	Sci. Abil.	Self-Confid.	Work w. People
VOCATIONAL-TECHNICAL PROGRAMS															
Trades	366				phys. (38)	low (18)			low (18)			high (44)	low (15)		
Tech.–Ag. Prod.	176	outdoor (176)	alone (28)		phys. (40)						low (14)				
Tech.–Engr.	246	indoor (12)				high (12)		high (14)			high (41)	high (27)	high (44)		
Health	74	indoor (23)	others (12)							high (24)		low (17)	high (25)	high (13)	
Soc. Service	127	outdoor (25)		varied (13)											
Business Contact	136	outdoor (15)												high (15)	
Business Detail	214	indoor (64)			nonphys. (117)				high (39)		high (15)	low (24)			
TRANSFER PROGRAMS															
Sci.–Health	38		alone (23)										high (16)		
Arts & Human.	43							high (13)			low (14)	low (16)			
Soc. Science	48										low (15)				
Bus. Admin.	87	indoor (13)			nonphys. (42)				high (16)			low (16)			
Overall X^2 for scale		341.0	117.5	52.2	276.1	70.6	36.4	56.2	89.7	58.9	119.0	168.4	129.7	57.3	39.2

NOTE.–This table summarizes 14 contingency table analyses, one for each of the scales listed across the top of the table. See Table 5.1 for an example of one of these analyses.

When the overall X^2 for a contingency table analysis exceeded the 99th percentile point (X^2 = 51 for 30 d.f.) and the X^2 associated with a particular cluster also exceeded the 99th percentile point (X^2 = 11 for 3 d.f.), the X^2 and response trend resulting in this X^2 are shown for the cluster. In general, the higher the X^2, the stronger the trend.

[a]Some analyses were based on slightly smaller Ns due to missing data. Maximum total N was 1,555.

TABLE 5.3

Differences on Single-Item Self-Report Scales for Students Grouped by Program Cluster: Women

Program cluster	N[a]	Working Condition Preferences: Indoor/ Outdoor	Others/ Alone	Varied/ Routine	Phys./ Nonphys.	Career-Related Personal Characteristics: Acad. Motiv.	Work Motiv.	Art. Abil.	Cler. Abil.	Engl. Abil.	Math. Abil.	Mech. Abil.	Sci. Abil.	Self-Confid.	Work w. People
VOCATIONAL-TECHNICAL PROGRAMS															
Trades	67		alone (22)	routine (12)						low (11)		high (17)			low (12)
Tech.–Ag. Prod.	b														
Tech.–Engr.	b														
Health	343	indoor (12)	others (14)		phys. (98)				low (14)				high (41)		
Soc. Service	111				phys. (21)										
Business Contact	83	outdoor (11)						high (12)							
Business Detail	261				nonphys. (124)				high (60)				low (29)		
TRANSFER PROGRAMS															
Sci.–Health	72	outdoor (12)	alone (12)								high (24)	high (13)	high (38)		
Arts & Human.	70							high (15)							
Soc. Science	111											low (12)			
Bus. Admin.	89	indoor (12)			nonphys. (28)				high (22)						
Overall χ^2 for scale		73.8	65.6	48.2	291.3	35.6	36.7	63.2	126.0	52.1	51.1	71.9	144.1	28.6	52.5

NOTE.—This table summarizes 14 contingency table analyses, one for each of the scales listed across the top of the table. See Table 5.1 for an example of these analyses.

When the overall χ^2 for a contingency table analysis exceeded the 99th percentile point (χ^2 = 43 for 24 d.f.) and the χ^2 associated with a particular cluster also exceeded the 99th percentile point (χ^2 = 11 for 3 d.f.), the χ^2 and response trend resulting in this χ^2 are shown for the cluster. In general, the higher the χ^2, the stronger the trend.

[a]Some analyses were based on slightly smaller Ns due to missing data. Maximum total N was 1,207.

[b]Not included in the analyses because of small sample size.

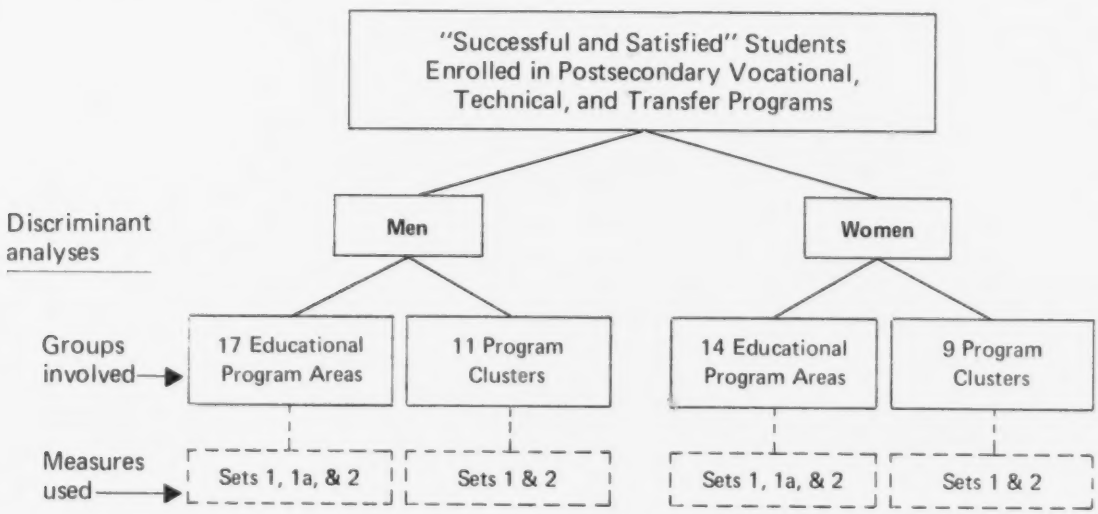
were studied through use of discriminant analysis, a statistical technique for finding those combinations of variables in a set of variables which best differentiate among various groups. In research on test scores, usually two combinations of variables (or *factors*) are sufficient to illustrate the main ways in which groups differ. The variables most associated with those differences can then be identified. Many current statistics texts discuss discriminant analysis and the associated centour score procedures. Two basic references have been provided by Rulon, Tiedeman, Tatsuoka, and Langmuir (1967) and Cooley and Lohnes (1971). The use of these procedures in test validation and test interpretation has recently been described by Prediger (1971a, 1971b).

Design of Analyses

Figure 5.2 provides an overview of the discriminant analyses that were performed in order to determine the ability of Career Planning Profile measures to differentiate "successful and satisfied" students enrolled in various vocational, technical, and transfer programs. The Set 1 and Set 1a measures used in the analyses are listed in Table 5.4. Set 2 measures are listed in Table 5.9 in a later section of this chapter. Basically, Set 1 measures include Career Planning Profile scales that are most likely to be related to *choice of* and *satisfaction with* educational program or occupation. Set 2 measures, which include the Ability Measures, Self-Estimates of different types of ability, and high school grades, are more likely to be related to *how well* a person does in a chosen endeavor. Hence, Set 1 measures are of primary interest in the study of differences among educational programs, while Set 2 measures are of primary interest in estimates of future performance. Nevertheless, one would expect certain program differences on the Set 2 measures, and for that reason, they were also included in the analyses.

The Set 1a measures represent a subset of Set 1 measures and were used to develop the Exploration Priorities provided in the Educational Planning Summary section of the Student Report. These measures were chosen, on the basis of expected effectiveness, prior to the analyses using Set 1 measures.

The 11 program clusters (9 for women) used in the discriminant analyses are identical to those listed in Tables 5.2 and 5.3. The 22 educational program areas (17 involving men, 14 involving women) and related N-counts are shown in Table 5.5. (Educational program areas combining several specific programs are presented in Table 5.6 along with examples of the educational programs included in the areas.) The sample sizes listed in the "Cases eligible" columns of Table 5.5 are based on students who were enrolled throughout the first term and who obtained first-term GPAs of 2.0 (C) or higher in courses directly related to their vocational, technical, or transfer programs. Grades in General Studies (Core) courses were not included in the GPAs for students in vocational and technical programs. In addition to meeting the "success" criteria described above, students included in the analysis groups also expressed satisfaction with their program choice in a survey conducted at the end of the first term as part of the Career Planning Analysis Service. Thus, the analysis groups consisted of "successful and satisfied" students as determined by the intermediate criteria described above. Educational program areas typically had students from a number of different institutions, with the median being 28 institutions for men and 20 for women. (See the "No. of institutions" columns of Table 5.5.) A total of 102 institutions contributed students to the analysis groups.



NOTE.—Ten analyses are involved in this design, one for each set of measures indicated in the last line above.

Fig. 5.2. Design for discriminant analyses conducted across programs.

Differences in Same Program across Institutions

Prior to the analyses across the various educational program areas, analyses were conducted to determine differences *across institutions* among enrollees in a given program. For example, enrollees in Auto Mechanics at various institutions were used as analysis groups in a discriminant analysis designed to investigate the degree to which Auto Mechanics enrollees differ from institution to institution. The results of such analyses were then used to eliminate "unusual institutions" from the analyses conducted *across programs.*

TABLE 5.4

Set 1 and Set 1a Measures Used in Discriminant Analyses

Measures	Set 1		Set 1a	
	Men	Women	Men	Women
WORKING CONDITION PREFERENCES				
Indoor/Outdoor	X	X	X	X
Others/Alone	X	X	–	–
Varied/Routine	X	X	–	–
Phys./Nonphys.	X	X	X	X
VOCATIONAL INTEREST PROFILE MEASURES				
Science	X	X	X	X
Health	X	X	–	X
Arts	X	X	X	X
Social Service	X	X	–	X
Business Contact	X	X	X	X
Business Detail	X	X	X	X
Trades	X	X	X	–
Technical	X	X	X	–
CAREER-RELATED COMPETENCIES				
Trades	X	–	X	–
Technical	–	–	–	–
Science	X	X	X	X
Arts	X	X	–	–
Business Contact	X	X	X	X
Business Detail	X	X	X	X
Social Service	–	X	–	X
JOB VALUES COMPOSITES				
Economic Security Composite[a]	X	X	X	X
Autonomy Composite[b]	X	X	X	X

NOTE.—Measures used in a given set are indicated by X.

[a]The Economic Security Composite consists of the sum of the Job Values ratings for Pay and Security.

[b]The Autonomy Composite consists of the sum of the Job Values ratings for Independence and Responsibility.

Table 5.7 lists the educational program areas for which within-program analyses were conducted. Separate analyses were conducted for the Ability Measures (Language Usage excluded) and the Vocational Interest Profile Scales.

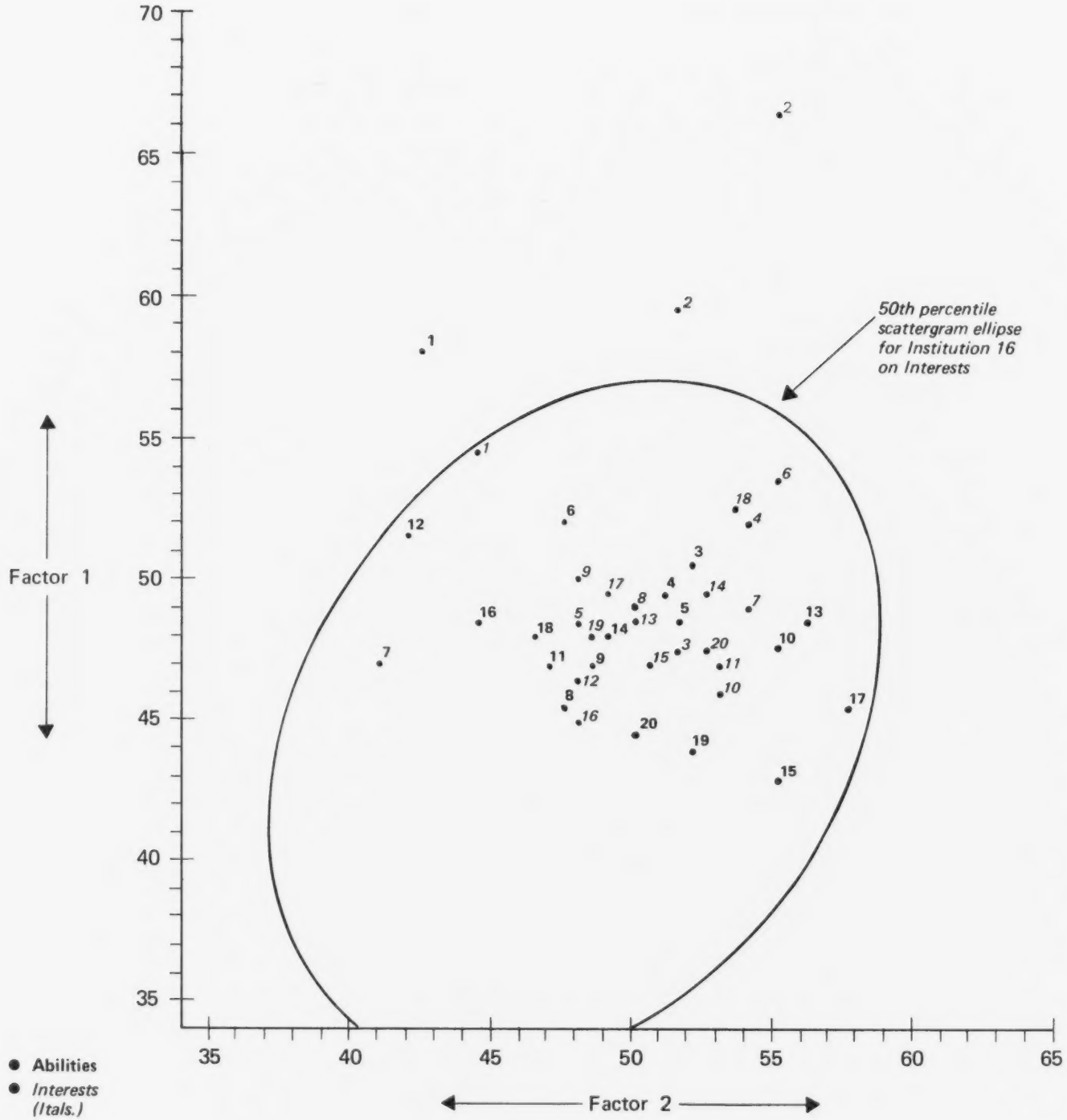
For men, 13 programs had seven or more institutions enrolling a minimum of 10 enrollees, the lower limit set for the analyses. There were 8 such programs for women. Thus, there were 26 within-program analyses for men and 16 for women for a total of 42 analyses.

Because of the volume of data resulting from these analyses, only a summary is presented here. All of the multivariate analysis of variance *F* values for the Ability Measures exceeded the 99th percentile of the associated *F* distribution. For the Vocational Interest Profile Scales, 11 of 13 exceeded this level for men and 6 of 8 for women. Hence, the institutional differences observed for most programs are unlikely to be the result of chance. The median Wilks' Lambda for the Ability Measures was .488 for men and .437 for women. The respective values were .602 and .605 for the Interest Scales, thus indicating that variation from institution to institution in the abilities of enrollees in a given program is substantially greater than variation in interests.[1]

The distribution of institution centroids in discriminant factor space was obtained in each of the 42 analyses. The first two factors accounted for about 50% to 75% of the discriminating power of the measures used in the analyses. A typical plot of institution centroids is presented in Figure 5.3, where the results for Registered Nursing enrollees at various institutions are shown. The distributions of nursing program enrollees on the first two ability and interest factors have been plotted on the same coordinate axes to conserve space. Hence, each institution appears twice in Figure 5.3. (Italics are used to indicate the location of institution centroids on the first two interest factors.) From the centroid plots, it is apparent that nursing program enrollees at Institutions 1 and 2 differ considerably from enrollees at the other institutions on both the Ability Measures and the Interest Scales.

The ellipse shown for Institution 16 in Figure 5.3 includes about 50% of the interest factor scores for nursing students enrolled at that institution. Similar, but not identical, ellipses could be drawn to represent the scatter of interest and ability factor scores for other institutions. One ellipse should be sufficient, however, to provide an estimate of the amount of overlap among the distributions for institutions. From the size of the ellipse and the concentration of institutional centroids, it is apparent that nursing students enrolled at most of the institutions score substantially the same on the measures. The plots showing differences in enrollees *across programs* presented later in this chapter indicate that the differentiation of students enrolled in *different educational programs* is much greater than the differentiation of "like-program" students enrolled in *different institutions.*

[1]Since Wilks' Lambda reflects the ratio of within-group "variation" to total-group "variation," a low Lambda indicates greater group differentiation. That is, it indicates less within-group variation, and consequently, more *among*-group variation than a higher Lambda for the same groups.



NOTE.—Discriminant factor score scales (Mean = 50, S.D. = 10) are based on all students included in the analysis. The distribution of the 20 institutions on the ability and interest factors is shown on the same axes for comparative purposes. Institution centroids for interest measures are indicated by the numbers in italics.

Fig. 5.3. Institutional differences on first two ability and interest factors for women enrolled in registered nursing programs.

Of the 20 institutions included in the *within*-program analyses for Registered Nursing, 3 relatively unusual institutions were eliminated from the subsequent *across*-program analyses. These institutions are shown as Numbers 1, 2, and 7 on Figure 5.3. In general, institutions were eliminated from the *across*-program analyses if the centroid for the institution on either the ability or the interest factors fell more than one standard deviation from the mean for all groups combined on either of the first two discriminant factors. For some of the larger programs, however, institutions falling between one-half to one standard deviation from the overall mean on both factors for both the Ability Measures and the Interest Scales were also eliminated. Table 5.7 provides a summary of the number of institutions and enrollees eliminated from further analyses through application of these criteria.

Differences across Educational Program Areas

The design for the *across*-program analyses was shown in Figure 5.2. The educational program areas involved are listed in Tables 5.5 and 5.6. The contributions of Set 1 and Set 2 variables to program differentiation are summarized in Tables 5.8 and 5.9, respectively. Results for Set 1a measures were quite similar to those for Set 1 and, hence, are not reported here. The Wilks' Lambdas and associated multivariate analysis

TABLE 5.5

Number of Students and Institutions Involved in Discriminant Analyses across Educational Program Areas

Educational program area	Men				Women			
		Analysis group				Analysis group		
	Cases available[a]	Cases eligible	Set 1a scores available	No. of institutions	Cases available[a]	Cases eligible	Set 1a scores available	No. of institutions
Auto Mechanics	1,036	356	297	34	--	--	--	--
Drafting	663	212	172	35	--	--	--	--
Machine Work	277	97	74	20	--	--	--	--
Other Trades	1,959	517	405	43	142	37[b]	27	11
Elect. Engr. Tech.	1,322	422	369	57	--	--	--	--
Agriculture	319	143	120	10	--	--	--	--
Other Technical	564	179	158	44	--	--	--	--
Science (Tr.)	697	114	88	51	--	--	--	--
Dental Assisting	--	--	--	--	361	129	116	13
Nursing–Pract.	--	--	--	--	648	307	255	19
Nursing–Regist.	--	--	--	--	757	305	260	31
Other Health	234	84[b]	56	20	711	277	224	29
Arts & Human. (Tr.)	415	51[b]	43	16	291	69[b]	56	17
Cosmetology	--	--	--	--	172	56	34	8
Police Science	283	79	62	18	--	--	--	--
Social Sci. (Tr.)	369	57[b]	47	22	532	106	84	29
Bus. & Marketing	420	84[b]	73	31	173	48[b]	42	16
Bus. Admin. (Tr.)	414	85	78	25	148	46[b]	37	21
Accounting	342	78	66	28	250	88	74	27
Computer Prog.	277	88	83	24	175	63[b]	59	20
Data Processing	327	102	94	31	243	80[b]	73	32
Secretarial Sci.	--	--	--	--	1,332	484	402	49
Total	9,918	2,748	2,285	--	5,935	2,095	1,743	--

NOTE.—All students in the analysis group had first-te[illegible] GPAs of 2.0 (C) or higher in coursework related to their programs *and* expressed satisfaction with their programs except for programs indicated by footnote b in the "Cases eligible" column.

"Cases available" minus "Cases eligible" indicates number of students who were not enrolled at end of first term, who were unsuccessful or unsatisfied, or who had missing success and satisfaction data.

[a]Indicates program enrollment after removal of "unusual" institutions identified in within-program analyses (see Table 5.6). About 10% of the students in the original sample were excluded for this reason. Original sample sizes were 10,870 for men and 6,694 for women.

[b]Students expressing no opinion on the satisfaction survey were combined with satisfied students to increase sample size.

of variance *F* values presented in the table footnotes indicate that the program differentiation achieved by Set 1 and Set 2 measures is extremely unlikely to be the result of chance. A comparison of the Lambdas for Set 1 and Set 2 measures shows that the Set 1 measures were considerably more effective in differentiating the educational program areas than the Ability Measures and Self-Estimates included in Set 2. The Wilks' Lambdas associated with Set 1a measures were .235 and .232 for men and women respectively, indicating little loss in group differentiation through use of the subset of Set 1 measures.

Measures differentiating programs. A comparison of the univariate *F* values for men in Tables 5.8 and 5.9 gives a good indication of which Career Planning Profile measures are most effective in differentiating the educational program areas. For men, the Trades, Technical, and Science Scales on the Vocational Interest Profile are the most effective. These are followed by the Math Usage Scale, Physical/Nonphysical Working Condition Preferences, Business Detail Interests, the Science Composite for the Career-Related Personal Characteristics Scales, and the Science Competency Scale. Health Interest is the most effective variable for females, followed by Business Detail Interests, Physical/Nonphysical Working Condition Preferences, and Science Competencies. Other comparisons will be left to the reader. With the exception of Job Values, each of the major sections of the Career Planning Profile listed in Tables 5.8 and 5.9 contains two or more scales which make a substantial contribution to the differentiation of vocational, technical, and transfer programs. Correlations (factor loadings) of Set 1 and Set 2 measures with the major discriminant factors are also shown in Tables 5.8 and 5.9. In general, these correlations are congruent with the univariate *F* values.

The contribution of the first three discriminant factors to overall group differentiation is shown in the last three rows of Tables 5.8 and 5.9. The Bartlett chi-squares associated with each factor indicate that program differences associated with the factors are extremely unlikely to be the result of chance.

TABLE 5.6

Examples of Educational Programs in Areas Combining Several Educational Programs

Educational program area	Men	Women
Other Trades	Air Cond., Refrig., Heating Construction Trades Automotive Body Repair	Commercial Art Graphic Arts
Agriculture	Agricultural Business Farming, Ranching Agricultural Mechanics	----
Other Technical	Civil Engineering Technology Mech. Engineering Technology Other Engineering Technologies	----
Science (Transfer)	Engineering Physical Sciences Biological Sciences	----
Other Health	Dental Technology Radiology & X-Ray Technology Medical Technology	Dental Hygiene Medical Assisting Medical Technology
Arts & Humanities (Transfer)	Liberal Arts Music Architecture	Liberal Arts Music
Social Science (Transfer)	Physical Education & Recreation Social Science Teaching	Teaching Social Science Community Service Work
Bus. & Marketing	Sales & Retailing Hotel, Motel, & Rest. Mngmt. Transportation	Sales & Retailing Department Store Managing Hotel, Motel, & Rest. Mngmt.

NOTE.—For each educational program area, program titles are listed in order of size of enrollment for the three largest programs with enrollments greater than five.

According to the "percent of trace" values, Factors 1 and 2 carried from 67% to 83% of the discriminating power of the measures used in the analyses for men and women. Hence, further discussion is limited to these first two discriminant factors.

Nature of program differences. The results presented thus far have not been concerned with the *manner* in which the educational program areas are differentiated by Career Planning Profile measures. The program centroid plots shown in Figures 5.4 through 5.7 provide a convenient way of summarizing program differentiation. In Figure 5.4, for example, the locations of the centroids for the 17 programs included in the analysis for men are shown for the first two discriminant factors. The factors represented in this figure and in Figure 5.5 are based on the measures used to obtain the Exploration Priorities shown on the Student Report (e.g., the Set 1a measures). The configuration of the programs on Set 1 measures was nearly identical.

Although the educational program areas are represented as single points (centroids) in Figures 5.4 through 5.7, there is actually considerable variation among members of a given program. The ellipse presented on each figure provides a good estimate of the amount of overlap among programs. As with the ellipse presented in Figure 5.3, each ellipse is based on the assumption of a normal bivariate distribution and is directly analogous to a scattergram. Each ellipse, or scattergram, includes 50% of the cases for the group indicated. These cases will be most highly concentrated at the center of the ellipse, i.e., near the point representing the program centroid. Cases falling outside of the ellipse will be concentrated along the edge of the ellipse. Similar, but not identical, ellipses could be drawn for the other programs. However, a single ellipse per figure provides good perspective on the degree to which the educational program areas overlap.

The Career Planning Profile measures having the highest correlations with each factor are shown as factor anchors in

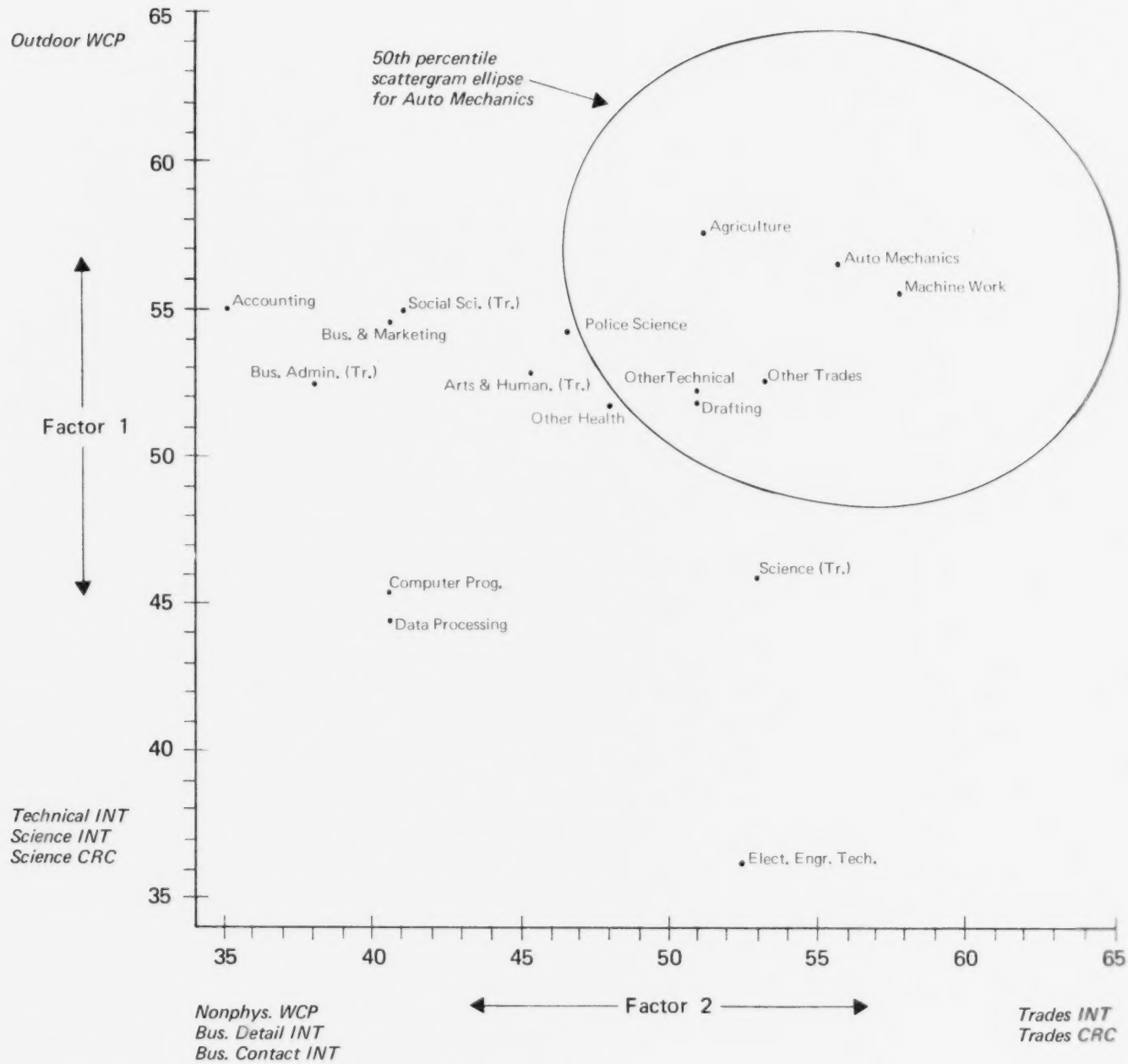
TABLE 5.7

Summary of Discriminant Analysis Search for Institutional Differences within Educational Program Areas

Educational program area	Men				Women			
	Number of institutions		Number of students		Number of institutions		Number of students	
	Original	Eliminated	Original	Eliminated	Original	Eliminated	Original	Eliminated
Auto Mechanics	33	8	1,074	186	a	--	--	--
Drafting	18	2	483	22	a	--	--	--
Machine Work	9	0	171	0	a	--	--	--
Other Trades	39	11	1,943	449	b	0	--	0
Elect. Engr. Tech.	25	1	892	27	a	--	--	--
Agriculture	11	2	328	29	a	--	--	--
Other Technical	20	2	380	28	a	--	--	--
Science (Tr.)	13	3	315	75	a	--	--	--
Dental Assisting	a	--	--	--	10	1	276	16
Nursing–Pract.	a	--	--	--	21	4	676	126
Nursing–Regist.	a	--	--	--	20	3	760	170
Other Health	b	0	--	0	18	3	573	48
Arts & Human. (Tr.)	b	0	--	--	b	0	--	0
Cosmetology	a	--	--	--	8	3	159	50
Police Science	8	1	200	15	a	--	--	--
Social Sci. (Tr.)	b	0	--	--	7	2	257	43
Bus. & Marketing	b	0	--	0	b	0	--	0
Bus. Admin. (Tr.)	14	3	311	53	b	0	--	0
Accounting	8	0	184	0	b	0	--	0
Computer Prog.	7	1	188	21	b	0	--	0
Data Processing	11	3	217	47	7	2	104	24
Secretarial Sci.	a	--	--	--	45	11	1,380	282

[a]Because of low enrollments, these programs were not included in any of the discriminant analyses for the indicated sex group.

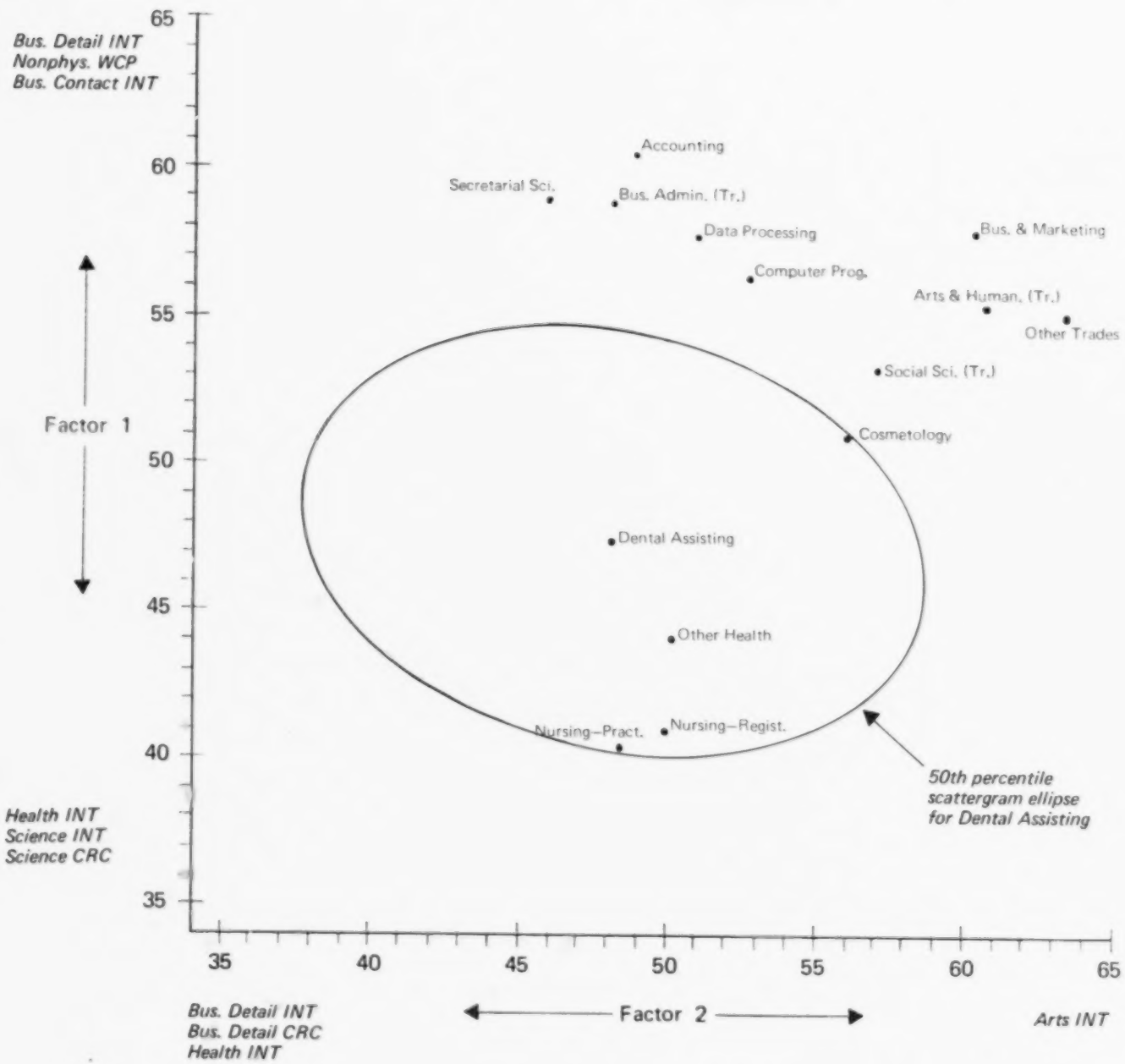
[b]Within-program analyses not performed because fewer than seven institutions had the minimum of 10 enrollees.



NOTE.—Factor score scales (Mean = 50, S.D. = 10) are based on all students included in the analysis. All measures correlating with the discriminant factors at .40 or higher are shown as factor anchors in rank order according to level of correlation. Where no measure met this criterion, measures with the highest correlations are shown.

Abbreviations used with measures are as follows: INT = Interests, WCP = Working Condition Preferences, and CRC = Career-Related Competencies.

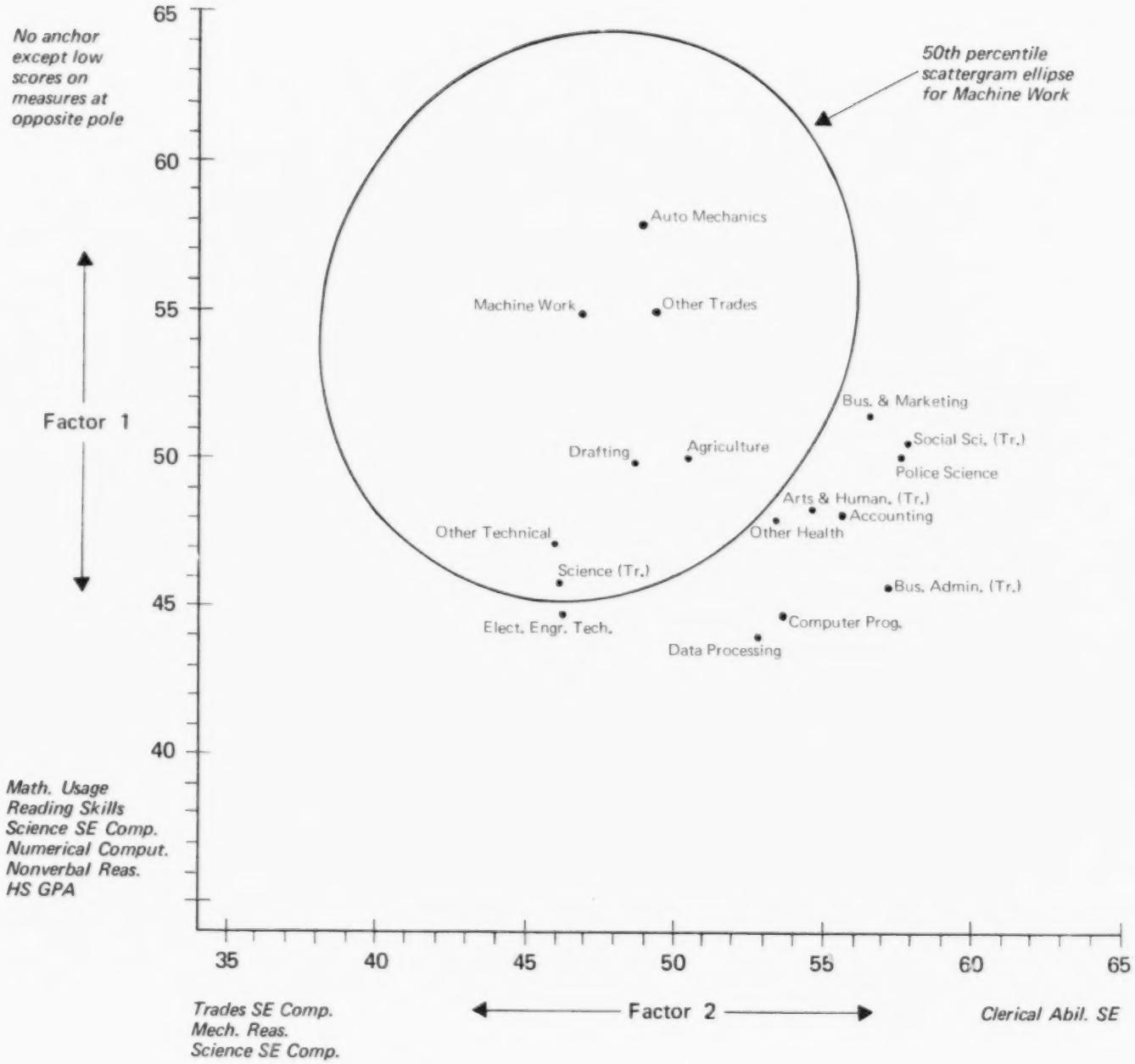
Fig. 5.4. Distribution of educational program areas on first two discriminant factors for Set 1a measures (men).



NOTE.—Factor score scales (Mean = 50, S.D. = 10) are based on all students included in the analysis. All measures correlating with the discriminant factors at .40 or higher are shown as factor anchors in rank order according to level of correlation. Where no measure met this criterion, measures with the highest correlations are shown.

Abbreviations used with measures are as follows: INT = Interests, WCP = Working Condition Preferences, and CRC = Career-Related Competencies.

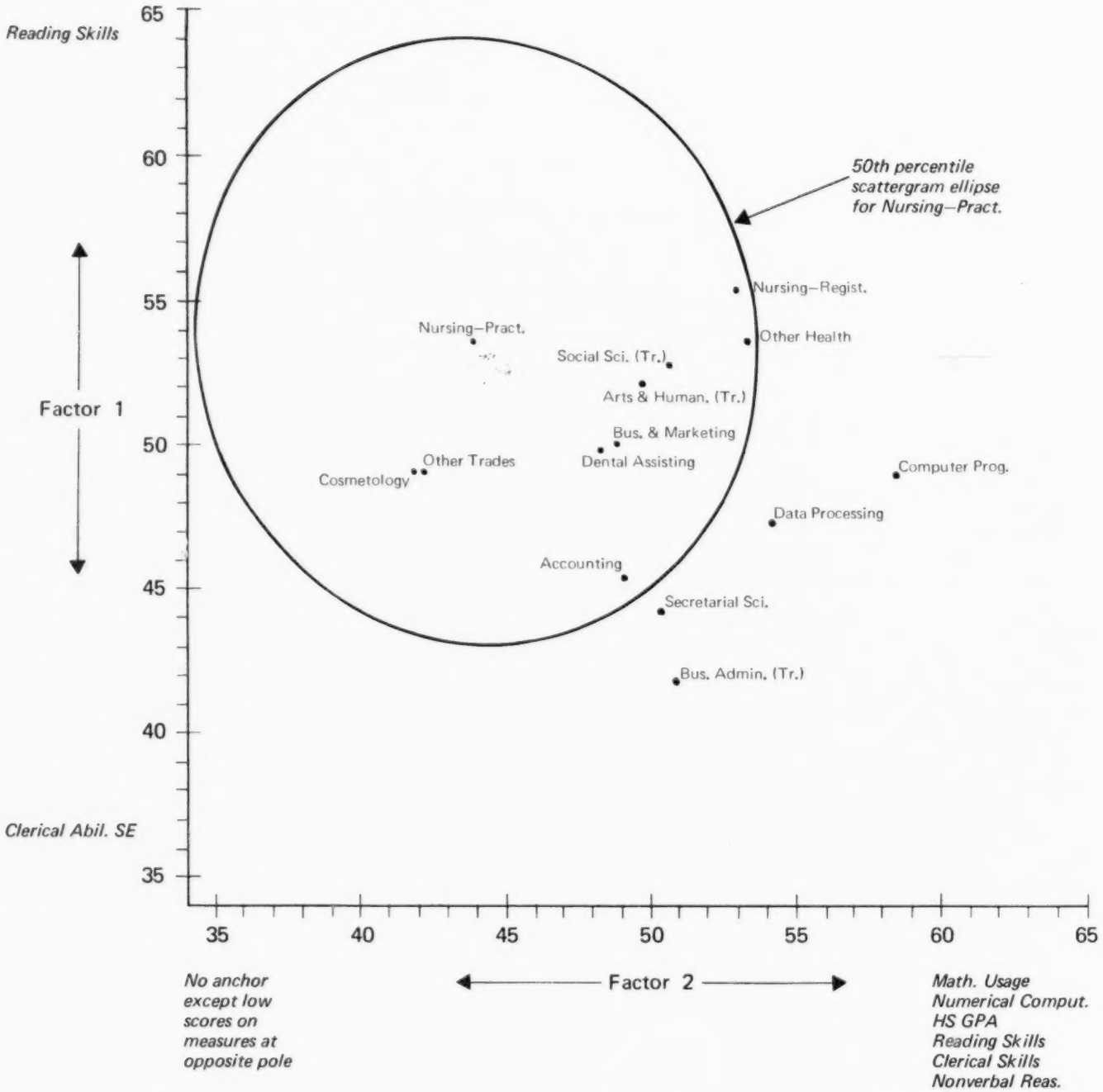
Fig. 5.5. Distribution of educational program areas on first two discriminant factors for Set 1a measures (women).



NOTE.—Factor score scales (Mean = 50, S.D. = 10) are based on all students included in the analysis. Up to six measures correlating with the discriminant factors at .40 or higher are shown as factor anchors in rank order according to level of correlation. Where no measure met this criterion, measures with the highest correlations are shown.

Abbreviations used with measures are as follows: HS GPA = overall high school grade point average, SE Comp. = self-estimate composite score on a Career-Related Personal Characteristics Scale.

Fig. 5.6. Distribution of educational program areas on first two discriminant factors for Set 2 measures (men).



NOTE.–Factor score scales (Mean = 50, S.D. = 10) are based on all students included in the analysis. Up to six measures correlating with the discriminant factors at .40 or higher are shown as factor anchors in rank order according to level of correlation. Where no measure met this criterion, measures with the highest correlations are shown.

Abbreviations used with measures are as follows: HS GPA = overall high school grade point average, SE Comp. = self-estimate composite score on a Career-Related Personal Characteristics Scale.

Fig. 5.7. Distribution of educational program areas on first two discriminant factors for Set 2 measures (women).

Figures 5.4 through 5.7. Enrollees in programs located toward the end of a factor tend to score high on the characteristics indicated by the factor anchor. They also tend to score low on the characteristics listed at the opposite end of the factor. Thus, we see from Figure 5.4 that males enrolled in Electrical Engineering Technology are located near the end of Factor 1 which is characterized by high scores on the Technical and Scientific Interest Scales and the Science Competency Scale. At the same time, they tend to score toward the "Indoor" end of the Indoor/Outdoor Working Condition Preferences Scale

TABLE 5.8

Contribution of Set 1 Variables to Differentiation of Educational Program Areas

Set 1 variables	Men				Women			
	Correlation with first 3 discriminant factors				Correlation with first 3 discriminant factors			
	1	2	3	Univariate F[a]	1	2	3	Univariate F[a]
WORKING CONDITION PREFERENCES								
Indoor/Outdoor	.25	.23	.00	18.4	−.03	.23	.14	2.5
Others/Alone	.01	.21	.10	3.2	.18	.21	−.30	7.1
Varied/Routine	.07	−.00	.07	2.5	.20	.10	.07	6.0
Phys./Nonphys.	−.06	−.63	.09	25.8	.62	−.22	−.12	46.8
VOCATIONAL INTEREST PROFILE								
Science	−.53	.07	−.22	28.4	−.44	.21	−.43	24.8
Health	−.19	−.23	−.66	17.6	−.79	−.38	−.15	95.4
Arts	−.07	−.21	−.29	8.4	−.07	.22	.13	3.6
Social Service	.00	−.34	−.32	9.1	−.24	−.04	.12	9.0
Business Contact	.09	−.53	.06	17.2	.41	−.05	.18	18.3
Business Detail	.02	−.60	.17	23.0	.63	−.46	−.25	55.1
Trades	.12	.65	.30	28.6	−.03	.23	−.25	3.7
Technical	−.84	.17	.22	75.2	.13	.27	−.62	11.1
CAREER-RELATED COMPETENCIES								
Trades	−.17	.45	.03	15.8	--	--	--	--
Science	−.43	.04	−.24	20.0	−.42	.22	−.22	25.4
Arts	−.07	−.06	−.14	2.5	−.11	.15	.08	3.5
Business Contact	−.05	−.04	−.02	1.3	−.07	.11	.01	2.0
Business Detail	−.11	−.37	.09	9.9	.22	−.40	−.27	10.5
Social Service	--	--	--	--	−.28	.13	−.11	9.6
JOB VALUES COMPOSITES								
Economic Security Comp.[b]	.01	.10	.07	2.0	.20	.02	−.08	5.5
Autonomy Comp.[c]	.04	.01	.07	.6	.08	.02	−.02	2.0
Bartlett's χ^2	1,413	898	393		1,663	339	239	
Degrees of freedom	34	32	30		31	29	27	
Percent of trace	47%	26%	10%		73%	10%	7%	

NOTE.—Wilks' Lambda = .195 for men and .199 for women. The associated *F* values are 12.5 (d.f. = 304 and 26,735) and 11.8 (d.f. = 247 and 18,003) for men and women, respectively.

[a]For men, an $F > 2.0$ is needed to exceed the 99th percentile point of the appropriate *F* distribution (d.f. = 16 and 2,190). For women, an $F > 2.2$ (d.f. = 13 and 1,685) is needed.

[b]The Economic Security Composite consists of the sum of the Job Values ratings for Pay and Security.

[c]The Autonomy Composite consists of the sum of the Job Values ratings for Independence and Responsibility.

(i.e., on the opposite end of the factor from the "Outdoor" anchor). On the other hand, students enrolled in Agriculture and Auto Mechanics (among other programs) score toward the "Outdoor" end of Factor 1. Factor 2 does a good job of differentiating business-related programs (e.g., Accounting, Business Administration, Business and Marketing) from typical trade programs (e.g., Auto Mechanics, Machine Work, Drafting). These programs were differentiated only slightly by Factor 1. Expected program differences are represented quite well by the measures listed as anchors for Factor 2.

Similar analyses of Figures 5.5, 5.6, and 5.7 are left to the reader. In general, the differences among educational program areas on Set 1a measures are according to expectation. Several expected similarities also occur (e.g., Computer Programming and Data Processing, Registered Nursing and Practical Nursing). Set 2 measures are less effective in differentiating the program areas. However, most program differences are also in expected directions. Considered as a whole, the results presented in Figures 5.4 through 5.7 and Tables 5.8 and 5.9 provide conclusive evidence of the ability of Career Planning Profile measures to differentiate successful and satisfied students enrolled in typical vocational, technical, and transfer programs.

The follow-up services provided as part of the Career Planning Program will make possible the collection of additional data on the career progress of these students and others in the years to come. Analyses involving "Satisfactory and Satisfied" employees are planned for the summer of 1973.

TABLE 5.9

Contribution of Set 2 Variables to Differentiation of Educational Program Areas

Set 2 variables	Men				Women			
	Correlation with first 3 discriminant factors			Univariate F[a]	Correlation with first 3 discriminant factors			Univariate F[a]
	1	2	3		1	2	3	
ABILITY MEASURES								
Mech. Reas.	−.37	−.47	−.17	11.1	.28	.46	.18	8.9
Nonverbal Reas.	−.41	−.19	.33	9.2	.01	.52	.56	11.0
Clerical Skills	−.31	.03	−.17	5.1	−.10	.60	−.02	9.2
Numerical Comput.	−.62	−.18	−.09	17.3	−.17	.83	.02	17.9
Math. Usage	−.77	−.20	−.10	27.1	.22	.85	.17	20.2
Space Relations	−.26	−.29	.04	6.7	.06	.44	.21	5.5
Reading Skills	−.64	.02	−.14	17.7	.37	.62	−.04	15.4
HS GPA	−.41	−.09	−.12	7.1	−.02	.69	−.08	11.9
CAREER-RELATED PERSONAL CHARACTERISTICS (SELF-ESTIMATES)								
Artistic Abil.	−.24	−.11	.85	12.1	.01	−.01	.74	6.9
Clerical Abil.	−.26	.44	−.03	9.2	−.73	.24	−.11	20.1
Science Comp.[b]	−.62	−.44	−.19	21.8	.36	.47	−.03	11.8
Trades Comp.[c]	−.11	−.70	−.06	13.2	.05	.33	.07	8.3
Interpr. Comp.[d]	−.07	.26	.05	3.6	.05	.05	.14	1.9
Bartlett's χ^2	637	356	197		415	310	147	
Degrees of freedom	28	26	24		25	23	21	
Percent of trace	46%	24%	13%		39%	28%	13%	

NOTE.—Wilks' Lambda = .562 for men and .565 for women. The associated *F* values are 7.3 (d.f. = 208 and 26,121) and 6.9 (d.f. = 169 and 18,368) for men and women, respectively.

[a]For men, an $F > 2.0$ is needed to exceed the 99th percentile point of the appropriate *F* distribution (d.f. = 16 and 2,583). For women, an $F > 2.2$ (d.f. = 13 and 1,993) is needed.

[b]The Science Composite consists of the sum of the Science and Math. Abilities, and Academic Motivation Self-Estimates.

[c]The Trades Composite consists of the sum of the Mechanical and Math. Self-Estimates.

[d]The Interpersonal Composite consists of the sum of the Social Self-Confidence and Working with People Self-Estimates.

These analyses will be based on students who took the Career Planning Profile in the fall of 1970 as part of the national norming. Analyses of the differences between "Successful and Satisfied" enrollees and "Unsuccessful and Unsatisfied" enrollees are currently underway. Results will be published as an *ACT Research Report* in the fall of 1972.

Differences across Program Clusters

As shown in Figure 5.2, the ability of Set 1 and Set 2 measures to differentiate students in 11 clusters of similar vocational, technical, and transfer programs was also investigated. The clusters involved are the same as those listed in the summary of the chi-square analyses presented in Tables 5.2 and 5.3. Separate analyses were conducted for men and women. Only a summary of these analyses is presented here since the results were similar to those obtained for the educational program areas.

Multivariate analysis of variance *F* values obtained in the analyses indicates that program cluster differentiation achieved by Set 1 and Set 2 measures is extremely unlikely to be the result of chance. As was the case with the educational program areas, Lambdas for Set 2 measures (.650 for men, .685 for women) were substantially higher than the Lambdas for Set 1 measures (.256 for men, .260 for women). Hence, Set 1 measures do a better job of differentiating the program clusters. The Lambdas obtained in each of the analyses across clusters were larger than the corresponding Lambdas obtained in the analyses across educational program areas. This is not surprising since the effect of grouping programs into clusters is to increase the ratio of *within*-group variation (dispersion) to the total-group variation. Lambda directly reflects this increase.

Factors 1 and 2 carried from 57% to 80% of the discriminating power of the measures used in the four analyses. Scales effective in differentiating educational program areas generally maintained their effectiveness with the program clusters. Additional scales correlating at the .40 level or higher with Factors 1 or 2 for men included the Health and Social Service Interest Scales and the Business Detail Competency Scale. For women, the Trades Composite for Career-Related Personal Characteristics was the only additional scale to meet this criterion. Differences among the program clusters reflected the same orderliness observed for the educational program areas. For example, men in the Natural Science and Health Cluster involving transfer programs and, especially, the Health Cluster involving vocational and technical programs tended to receive high scores on the Health and Social Service Interest Scales. Students in the Technical (Engineering Applications) Cluster and Trade and Industrial Cluster tended to score low on these scales, but high on the Trade and Technical Interest Scales. The Business Administration and Business Detail Clusters were clearly differentiated from the above clusters by their Nonphysical Working Condition Preferences, Business Contact Interests, Business Detail Interests, and Business Detail Competencies.

The program clusters for women tended to be organized into three groups on both Set 1 and Set 2 measures: (a) Business Administration and Business Detail; (b) Natural Science and Health (transfer) and Health (vocational-technical); and (c) Social Science, Social Service, Business Contact, and Arts and Humanities. Factor 1 for the Set 1 measures provided the greatest differentiation among these three clusters. The anchors for Factor 1 are identical to those shown in Figure 5.5.

Exploration Priorities

As noted in the introduction to Chapter 4, validity data in the form of research results are of little use in the guidance office. Hence, procedures for applying these data to the conversion of test scores into counseling information are crucial. In the case of discriminant analysis data, the appropriate procedure is called the "centour score."

Centour scores were developed some 20 years ago by Tiedeman, Bryan, and Rulon (1951). Prediger (1971a, 1971b) has recently described their use in career guidance. Basically, centour scores are numerical indices representing an individual's *similarity* to members of various groups. The more similar an individual is to typical members of a group, the higher his centour score for that group. Centour scores range from 0 to 100. For a given individual, there is one centour score per group.

As measures of similarity, centour scores do *not* directly provide a probability of group membership nor a prediction of group entrance. Probability statements are also possible; however, they will be sensitive to relative group size in addition to similarity. Thus, in the context of the Career Planning Profile, centour scores simply reflect the similarity of a student's characteristics, as assessed by Set 1a measures, to the characteristics of successful and satisfied students enrolled in various vocational, technical, and transfer programs. If the number of students enrolled in a particular program is small in comparison with other programs, the probability that the student will enter that program may also be small, even if he has a high centour score for the program. Hence, centour scores should be used to call the student's attention to educational programs he might want to explore, and *not* to indicate which program he will or should choose.

Profile analysis, that is, comparison of a student's test score profile with the profiles for various groups, provides a subjective version of centour score procedures. In career counseling, for example, one may be interested in finding curricular groups with test score profiles which closely match the profile of a counselee. The degree of match, subjectively judged, indicates the *similarity* of the counselee's test scores to those of members of the various curricular groups. A high degree of similarity might suggest a curricular area that the counselee would want to explore—find out more about.

It is important to note that, in the above example, degree of *similarity*, not *success*, is being assessed. Similarity analysis, whether subjective or via centour scores, does not directly

yield information about the probability of success. It is true that when criterion group members have been screened for "success," some degree of success is usually implied by similarity. However, estimates of future success or performance are much better obtained via regression analysis.

Several problems arise in conjunction with the profile approach to similarity analysis described above. For example, how close is "close" in profile analysis? Should one give equal weight to all scores in a profile when comparing similarities? If not, what weights should be assigned and how? How does one analyze profiles on different kinds of measures (interests, competencies, etc.) simultaneously? How does one, from the standpoint of practicality, analyze the profiles of student after student against those of each of a number of criterion groups? All of these problems are, for the most part, solved through the use of centour scores.

In the Career Planning Program, centour scores are obtained as an intermediate step in developing the "Exploration Priorities" shown in the Educational Planning Summary section of the Student Report. In the 1972 test year, these centour scores will be based on the results of the discriminant analyses reported in this chapter and illustrated in Figures 5.4 and 5.5. Only the first two discriminant factors are used in obtaining a student's centour scores. These scores are then transformed by a set of decision rules to the asterisks appearing in the "Exploration Priority" column. No more than five or six programs per student will receive asterisks. The goal is to suggest educational programs for the student to explore without overwhelming him with possibilities.

As part of program exploration, students will be interested in estimates of performance in the coursework. The bases for these estimates, presented as "Chances of 'C' Average or Higher" on the Career Planning Profile Student Report, were discussed in Chapter 4. Used together, the "Exploration Priorities" and "Chances of 'C' Average or Higher" represent powerful tools for career guidance.

APPENDIXES

APPENDIX A GENERAL NORMS

APPENDIX B PROGRAM CLUSTER NORMS

APPENDIX C SPECIAL SUBGROUP NORMS

APPENDIX D INSTITUTIONS ADMINISTERING THE CPP DURING THE NATIONAL NORMING PERIOD

APPENDIX A

GENERAL NORMS

Table 1. Distribution of Ability Measures (in percentiles)

Table 2. Distribution of Vocational Interest Profile Scales (in percentiles)

Table 3. Percentage Distribution for H.S. Grades, Career-Related Competencies, and Personal Characteristics

Table 4. Percentage Distribution of Working Conditions Preferences

Table 5. Percentage Distribution of Ratings of Job Values

GENERAL NORMS

TABLE 1 Distribution of Ability Measures (in percentiles)

Standard Score	Mechanical Reasoning			Numerical Computation			Math Usage			Space Relations			Standard Score
	M	F	T	M	F	T	M	F	T	M	F	T	
76-80	99	99	99	99	99	99	99	99	99	99	99	99	76-80
71-75	99	99	99	98	98	98	99	99	99	98	99	99	71-75
66-70	94	99	96	96	95	96	94	97	96	94	99	96	66-70
61-65	84	99	90	89	88	89	86	93	89	87	96	90	61-65
58-60	71	96	81	80	79	79	78	88	82	77	91	82	58-60
55-57	60	93	72	71	70	71	67	80	72	65	84	72	55-57
52-54	49	88	64	61	60	61	55	70	61	53	73	60	52-54
49-51	33	76	49	49	48	49	42	57	48	41	61	48	49-51
46-48	23	63	38	40	38	39	29	41	33	30	48	37	46-48
43-45	16	49	28	29	27	28	20	30	24	21	35	26	43-45
40-42	9	32	18	18	17	18	16	24	19	14	24	18	40-42
35-39	5	18	10	10	9	10	12	19	14	9	14	11	35-39
30-34	2	8	4	4	3	4	5	9	7	4	6	5	30-34
25-29	1	2	1	2	1	1	2	3	2	2	3	2	25-29
20-24	1	1	1	1	1	1	0	0	0	1	1	1	20-24
	M	F	T	M	F	T	M	F	T	M	F	T	
Mean	53.6	44.2	50.0	49.8	50.3	50.0	51.2	47.6	49.8	51.7	47.0	49.9	Mean
S.D.	9.5	8.0	10.0	10.2	10.0	10.1	10.3	10.2	10.4	10.5	9.4	10.4	S.D.

Standard Score	Reading Skills			Language Usage			Clerical Skills			Nonverbal Reasoning			Standard Score
	M	F	T	M	F	T	M	F	T	M	F	T	
76-80	99	99	99			99	99	99	99	99	99	99	76-80
71-75	99	99	99			99	98	97	98	98	99	98	71-75
66-70	96	96	96			98	95	92	94	96	96	96	66-70
61-65	89	89	89			93	90	86	88	90	89	89	61-65
58-60	82	80	82			84	84	77	81	82	80	81	58-60
55-57	75	73	74			76	77	68	73	75	73	74	55-57
52-54	64	62	63			65	67	58	64	63	61	62	52-54
49-51	50	48	50	NOT YET		54	56	47	53	51	49	50	49-51
46-48	37	36	36	AVAILABLE		42	44	36	41	40	39	40	46-48
43-45	28	27	27			31	33	26	30	29	28	28	43-45
40-42	18	18	18			21	21	17	19	18	18	18	40-42
35-39	10	9	9			13	10	9	10	10	10	10	35-39
30-34	4	3	4			5	4	4	4	4	4	4	30-34
25-29	2	1	1			2	2	2	2	1	2	1	25-29
20-24	1	1	1			1	1	1	1	1	1	1	20-24
	M	F	T	M	F	T	M	F	T	M	F	T	
Mean	49.9	50.4	50.1			50.0	49.3	51.3	50.1	49.8	50.0	49.9	Mean
S.D.	10.0	9.9	10.0			10.0	10.2	10.8	10.5	10.0	10.1	10.0	S.D.

NOTE.–Average sample size was 10,512 for males, and 6,507 for females. However, there were slight variations from measure to measure due to missing data.

TABLE 2 Distribution of Vocational Interest Profile Scales (in percentiles)

Standard Score	Trades			Technical			Science			Health			Standard Score
	M	F	T	M	F	T	M	F	T	M	F	T	
76-80	99	99	99	99	99	99	99	99	99	99	99	99	76-80
71-75	98	99	99	98	99	99	98	99	99	99	97	99	71-75
66-70	93	99	96	94	99	96	94	98	96	99	91	96	66-70
61-65	82	99	89	83	99	89	86	95	89	97	76	89	61-65
58-60	68	99	80	70	98	81	76	91	82	93	59	79	58-60
55-57	52	98	70	58	96	73	65	84	72	88	48	72	55-57
52-54	35	95	58	43	90	61	52	75	60	80	39	64	52-54
49-51	21	86	46	30	80	49	41	66	51	66	28	52	49-51
46-48	12	73	35	20	68	38	30	55	39	50	19	38	46-48
43-45	6	60	27	11	54	28	19	41	27	38	13	28	43-45
40-42	3	47	20	6	40	19	11	29	18	26	9	20	40-42
35-39	1	29	12	3	24	11	6	18	11	14	4	10	35-39
30-34	1	14	5	1	9	4	2	7	4	5	1	3	30-34
25-29	1	6	3	1	3	1	1	2	1	2	1	1	25-29
20-24	1	2	1	1	2	1	1	1	1	1	1	1	20-24
	M	F	T	M	F	T	M	F	T	M	F	T	
Mean	55.6	41.1	50.0	54.4	42.9	50.0	52.4	46.2	50.0	46.5	55.5	50.0	Mean
S.D.	7.6	8.3	10.6	8.6	8.1	10.1	9.5	9.6	10.0	8.5	9.8	10.0	S.D.

Standard Score	Arts			Social Service			Business Contact			Business Detail			Standard Score
	M	F	T	M	F	T	M	F	T	M	F	T	
76-80	99	99	99	99	99	99	99	99	99	99	99	99	76-80
71-75	99	98	99	99	98	99	99	99	99	99	98	99	71-75
66-70	99	93	97	99	92	96	97	96	96	98	93	96	66-70
61-65	95	82	90	96	78	89	90	86	89	94	81	89	61-65
58-60	89	69	81	91	61	80	82	75	79	89	69	81	58-60
55-57	83	57	73	85	47	71	73	64	70	82	59	73	55-57
52-54	72	43	61	77	34	61	65	55	62	72	48	63	52-54
49-51	59	30	48	67	24	51	56	46	52	58	37	50	49-51
46-48	48	21	38	55	16	40	44	35	41	43	26	36	46-48
43-45	37	14	28	40	9	28	33	25	30	31	19	26	43-45
40-42	25	8	18	27	4	18	21	16	19	21	13	18	40-42
35-39	13	4	10	16	2	10	11	8	10	12	7	10	35-39
30-34	5	2	4	6	1	4	5	3	4	5	3	4	30-34
25-29	2	1	1	2	1	1	2	1	1	2	1	1	25-29
20-24	1	1	1	1	1	1	1	1	1	1	1	1	20-24
	M	F	T	M	F	T	M	F	T	M	F	T	
Mean	47.4	54.2	50.0	46.3	56.1	50.1	49.2	51.4	50.0	48.0	53.2	50.0	Mean
S.D.	9.3	9.3	9.9	8.9	8.4	10.0	9.9	9.8	10.0	9.1	10.3	9.9	S.D.

NOTE.—Average sample size was 10,292 for males, and 6,416 for females. However, there were slight variations from measure to measure due to missing data.

TABLE 3 Percentage Distribution for H.S. Grades, Career-Related Competencies, and Personal Characteristics

HIGH SCHOOL GRADES

		ENGLISH	MATH	SOCIAL STUDIES	NATURAL SCIENCES	BUSINESS	VOCATIONAL	
MALES	A	4.0	6.9	8.1	6.3	12.3	31.8	A
	B	25.7	24.1	32.8	28.8	36.8	42.8	B
	C	54.3	47.9	47.8	49.8	42.0	22.5	C
	D	14.8	18.3	10.5	13.8	7.6	2.5	D
	F	1.3	2.8	0.8	1.4	1.3	0.4	F
	NT	2.6	4.3	5.9	10.5	42.0	31.6	NT
FEMALES	A	17.4	9.3	17.7	11.1	27.4	38.0	A
	B	48.4	31.4	42.6	37.8	43.9	44.6	B
	C	31.1	45.5	35.3	43.4	25.8	16.6	C
	D	2.9	12.7	4.2	7.1	2.6	0.7	D
	F	0.2	1.2	0.2	0.6	0.3	0.1	F
	NT	1.6	4.1	4.0	8.3	18.7	38.1	NT
TOTAL	A	9.2	7.8	11.8	8.1	19.4	34.0	A
	B	34.4	26.9	36.6	32.3	40.1	43.4	B
	C	45.4	47.0	43.0	47.3	34.4	20.4	C
	D	10.2	16.2	8.1	11.2	5.3	1.9	D
	F	0.8	2.2	0.6	1.1	0.8	0.3	F
	NT	2.2	4.2	5.2	9.6	33.1	34.1	NT

NOTE.–NT = Not Taken. Percentages for NT are based on *total group*. Percentages for letter grades are based on those students who took that course. Therefore, A–F = 100%.

–Average sample size was 10,276 for males, and 6,357 for females. However, there were slight variations from measure to measure due to missing data.

CAREER-RELATED COMPETENCIES

		TRADES	TECHNICAL	SCIENCE	ARTS	SOC. SERVICE	BUS. CONTACT	BUS. DETAIL	
MALES	MANY	16.2	14.2	9.4	5.4	6.0	14.6	4.2	MANY
	SOME	57.9	56.9	45.4	32.8	34.8	36.4	39.1	SOME
	FEW	24.8	28.5	39.2	45.4	35.7	47.4	45.9	FEW
	NONE	1.2	0.4	6.0	16.4	23.5	1.6	10.9	NONE
FEMALES	MANY	1.1	0.8	5.1	17.1	14.6	5.3	13.4	MANY
	SOME	5.7	14.7	36.3	53.2	53.4	25.1	51.0	SOME
	FEW	52.2	77.7	49.3	26.5	24.8	64.8	30.9	FEW
	NONE	41.0	6.7	9.2	3.2	7.2	4.8	4.7	NONE
TOTAL	MANY	10.6	9.3	7.8	10.0	9.4	11.0	7.8	MANY
	SOME	38.7	41.3	41.9	40.8	42.1	32.0	43.8	SOME
	FEW	34.9	46.7	43.1	38.0	31.4	54.2	40.0	FEW
	NONE	15.8	2.7	7.2	11.2	17.1	2.8	8.4	NONE

NOTE.–Average sample size was 9,649 for males, and 6,003 for females. However, there were slight variations from measure to measure due to missing data.

[Continued]

TABLE 3 *[Continued]* Percentage Distribution for H.S. Grades, Career-Related Competencies, and Personal Characteristics

CAREER-RELATED PERSONAL CHARACTERISTICS (SELF-ESTIMATES)

		Academic Motivation	Work Motivation	Artistic Ability	Clerical Ability	English Ability	Math Ability	Mechanical Ability	Scientific Ability	Social Self-Confidence	Working with People	
MALES	TT	5.8	12.5	4.1	2.8	2.4	3.9	12.6	2.0	4.5	11.9	TT
	AA	29.2	48.7	17.7	15.8	14.3	21.0	43.6	12.1	20.2	42.4	AA
	A	58.9	37.2	37.5	54.0	56.6	50.6	37.5	49.1	55.6	42.7	A
	BA	6.1	1.6	40.8	27.3	26.6	24.6	6.2	36.7	19.8	3.1	BA
FEMALES	TT	9.2	14.4	3.4	5.2	4.5	2.0	1.1	1.2	5.9	12.2	TT
	AA	37.1	50.7	18.5	25.9	24.1	11.3	9.4	7.7	23.9	45.6	AA
	A	51.0	33.6	43.1	54.2	59.9	47.5	45.3	47.7	57.2	40.5	A
	BA	2.6	1.3	35.0	14.7	11.5	39.2	44.2	43.4	12.9	1.6	BA
		Academic Motivation	Work Motivation	Artistic Ability	Clerical Ability	English Ability	Math Ability	Mechanical Ability	Scientific Ability	Social Self-Confidence	Working with People	
TOTAL	TT	7.1	13.2	3.8	3.7	3.2	3.2	8.2	1.7	5.0	12.0	TT
	AA	32.2	49.4	18.0	19.7	18.1	17.3	30.6	10.4	21.6	43.6	AA
	A	55.9	35.8	39.7	54.1	57.9	49.4	40.5	48.6	56.2	41.9	A
	BA	4.8	1.5	38.6	22.5	20.8	30.2	20.7	39.3	17.2	2.5	BA

NOTE.–TT = Top Ten Percent, AA = Above Average, A = Average, BA = Below Average.

–Average sample size was 10,502 for males, and 6,491 for females. However, there were slight variations from measure to measure due to missing data.

TABLE 4 Percentage Distribution of Working Conditions Preferences

		(A) Indoor work vs (B) Outdoor work	(A) Work with others vs (B) Work alone	(A) Varied work vs (B) Routine work	(A) Physical work vs (B) Nonphysical work	
MALES	Strongly prefer A	14.0	28.5	39.2	38.3	Strongly prefer A
	Prefer A	35.6	48.4	47.9	40.7	Prefer A
	Prefer B	30.1	17.4	9.3	14.7	Prefer B
	Strongly prefer B	20.4	5.7	3.6	6.3	Strongly prefer B
		(A) Indoor work vs (B) Outdoor work	(A) Work with others vs (B) Work alone	(A) Varied work vs (B) Routine work	(A) Physical work vs (B) Nonphysical work	
FEMALES	Strongly prefer A	22.9	49.2	44.6	30.3	Strongly prefer A
	Prefer A	52.7	40.1	45.4	37.9	Prefer A
	Prefer B	17.7	8.3	7.6	23.3	Prefer B
	Strongly prefer B	6.7	2.4	2.4	8.5	Strongly prefer B
		(A) Indoor work vs (B) Outdoor work	(A) Work with others vs (B) Work alone	(A) Varied work vs (B) Routine work	(A) Physical work vs (B) Nonphysical work	
TOTAL	Strongly prefer A	17.4	36.4	41.3	35.2	Strongly prefer A
	Prefer A	42.2	45.2	46.9	39.6	Prefer A
	Prefer B	25.3	13.9	8.6	18.0	Prefer B
	Strongly prefer B	15.1	4.5	3.1	7.1	Strongly prefer B

NOTE.–Average sample size was 10,237 for males, and 6,388 for females. However, there were slight variations from measure to measure due to missing data.

TABLE 5 Percentage Distribution of Ratings of Job Values

	JOB VALUES						
MALES							
Very Import.	45.1	21.9	72.2	24.2	13.7	30.0	Very Import.
Important	47.4	47.2	24.6	46.3	41.9	53.8	Important
Of Some Import.	5.9	28.4	1.9	23.8	37.5	14.2	Of Some Import.
Unimportant	1.6	2.5	1.3	5.8	6.9	1.9	Unimportant
	Coworkers	Independence	Interest	Job Security	Pay	Responsibility	
FEMALES							
Very Import.	53.3	12.6	76.5	17.1	7.6	28.0	Very Import.
Important	41.2	43.2	21.0	42.3	31.8	51.1	Important
Of Some Import.	4.1	39.8	0.8	32.3	48.0	18.6	Of Some Import.
Unimportant	1.4	4.4	1.7	8.3	12.6	2.3	Unimportant
	Coworkers	Independence	Interest	Job Security	Pay	Responsibility	
TOTAL							
Very Import.	48.2	18.4	73.8	21.4	11.4	29.2	Very Import.
Important	45.0	45.7	23.2	44.8	38.0	52.8	Important
Of Some Import.	5.2	32.8	1.5	27.0	41.5	15.9	Of Some Import.
Unimportant	1.6	3.2	1.5	6.8	9.1	2.1	Unimportant

NOTE.—Average sample size was 10,492 for males, and 6,490 for females. However, there were slight variations from measure to measure due to missing data.

APPENDIX B

PROGRAM CLUSTER NORMS

VOCATIONAL-TECHNICAL PROGRAM CLUSTERS

- Trade & Industrial
- Technical-Agriculture Production
- Technical-Engineering Applications
- Health
- Social Science & Public Service
- Business Contact & Marketing
- Business Detail & Office

TRANSFER PROGRAM CLUSTERS

- Natural Science & Health
- Arts & Humanities
- Social Science & Public Service
- Business Administration

Cluster Profiles

"Profiles for Ability Measures and Vocational Interest Profile Scales" are presented for both sexes for each of the above program clusters except for females in the Technical-Agriculture Production and the Technical-Engineering Applications clusters. Sample sizes were not sufficient to report profiles in these two cases. Program Cluster Norms are not yet available for Language Usage.

Description of Profiles

For each measure, the light line represents the range between the 10th and 90th percentiles. The bold bar represents the middle 50% (the scores that span the range between the 25th to the 75th percentiles) and the horizontal line represents the 50th percentile. Percentiles, rather than means and standard deviations, were used in developing these profiles because percentiles are sensitive to skewness in the distribution.

A *blank profile sheet* is included on the last page in this appendix. This profile sheet may be reproduced and used to plot the profiles for counselees.

Tabular Norms

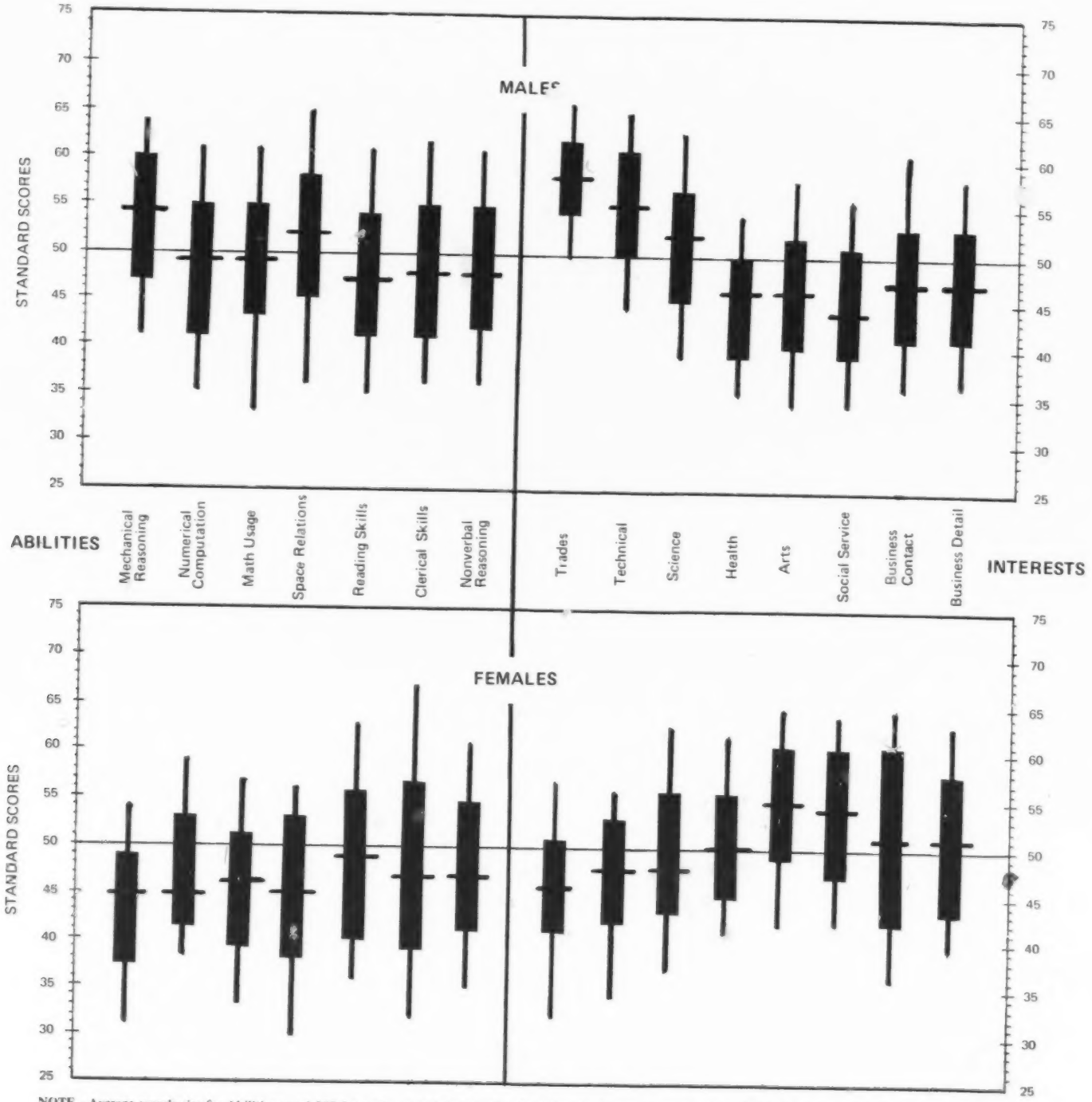
A table entitled "Percentage Distribution for H.S. Grades, Career-Related Competencies, and Personal Characteristics" is presented for both sexes for each of the above program clusters except for females in the Technical-Agriculture Production and the Technical-Engineering Applications clusters. Sufficient sample sizes were not available to report reliable data in these two cases.

Caution

The norms included in this section were based on data obtained from students who had entered but had not necessarily completed post-high school programs. These norms should not be treated as absolutes. Rather, they should be used as tools to facilitate career exploration.

TRADE & INDUSTRIAL

FIGURE 1 Profiles for Ability Measures and Vocational Interest Profile Scales



NOTE.–Average sample size for Abilities was 4,398 for males, and 96 for females. For Interests the average sample size was 4,297 for males, and 94 for females. However, for both Abilities and Interests there were slight variations from measure to measure due to missing data.

–The profiles for females should be interpreted with caution because of the small sample size.

TRADE & INDUSTRIAL

TABLE 1 Percentage Distribution for H.S. Grades, Career-Related Competencies, and Personal Characteristics

HIGH SCHOOL GRADES

		ENGLISH		MATH		SOCIAL STUDIES		NATURAL SCIENCES		BUSINESS		VOCATIONAL		
MALES	A	2.6	**4.0**	6.5	**6.9**	5.7	**8.1**	4.8	**6.3**	9.5	**12.3**	32.2	**31.8**	A
	B	21.2	**25.7**	23.1	**24.1**	29.2	**32.8**	27.1	**28.8**	33.4	**36.8**	43.0	**42.8**	B
	C	56.0	**54.3**	49.2	**47.9**	50.2	**47.8**	50.8	**49.8**	45.3	**42.0**	22.4	**22.5**	C
	D	18.4	**14.8**	18.7	**18.3**	13.6	**10.5**	15.7	**13.8**	10.1	**7.6**	2.2	**2.5**	D
	F	1.8	**1.3**	2.5	**2.8**	1.2	**0.8**	1.7	**1.4**	1.7	**1.3**	0.2	**0.4**	F
	NT	3.8	**2.6**	5.8	**4.3**	8.4	**5.9**	13.5	**10.5**	45.4	**42.0**	25.8	**31.6**	NT
FEMALES	A	15.4	**17.4**	9.9	**9.3**	13.1	**17.7**	9.6	**11.1**	21.2	**27.4**	35.0	**38.0**	A
	B	47.2	**48.4**	27.5	**31.4**	40.5	**42.6**	44.6	**37.8**	39.4	**43.9**	40.0	**44.6**	B
	C	31.9	**31.1**	39.6	**45.5**	44.0	**35.3**	36.1	**43.4**	36.4	**25.8**	21.7	**16.6**	C
	D	4.4	**2.9**	22.0	**12.7**	2.4	**4.2**	9.6	**7.1**	3.0	**2.6**	3.3	**0.7**	D
	F	1.1	**0.2**	1.1	**1.2**	0.0	**0.2**	0.0	**0.6**	0.0	**0.3**	0.0	**0.1**	F
	NT	3.2	**1.6**	3.2	**4.1**	9.7	**4.0**	10.8	**8.3**	29.8	**18.7**	34.8	**38.1**	NT

NOTE.–NT = Not Taken. Percentages for NT are based on *total group*. Percentages for letter grades are based on those students who took that course. Therefore, A–F = 100%.

–Average sample size was 4,288 for males, and 93 for females. However, there were slight variations from measure to measure due to missing data.

CAREER-RELATED COMPETENCIES

		TRADES		TECHNICAL		SCIENCE		ARTS		SOC. SERVICE		BUS. CONTACT		BUS. DETAIL		
MALES	MANY	20.8	**16.2**	14.7	**14.2**	7.2	**9.4**	5.5	**5.4**	4.9	**6.0**	13.7	**14.6**	3.3	**4.2**	MANY
	SOME	61.6	**57.9**	60.0	**56.9**	41.9	**45.4**	30.6	**32.8**	30.9	**34.8**	36.3	**36.4**	34.7	**39.1**	SOME
	FEW	17.4	**24.8**	25.1	**28.5**	43.8	**39.2**	45.6	**45.4**	36.4	**35.7**	48.3	**47.4**	49.0	**45.9**	FEW
	NONE	0.3	**1.2**	0.2	**0.4**	7.1	**6.0**	18.3	**16.4**	27.8	**23.5**	1.7	**1.6**	13.0	**10.9**	NONE
FEMALES	MANY	2.3	**1.1**	1.2	**0.8**	2.3	**5.1**	26.1	**17.1**	20.5	**14.6**	11.5	**5.3**	12.6	**13.4**	MANY
	SOME	18.6	**5.7**	25.3	**14.7**	36.4	**36.3**	43.2	**53.2**	39.7	**53.4**	24.1	**25.1**	50.6	**51.0**	SOME
	FEW	59.3	**52.2**	67.5	**77.7**	52.3	**49.3**	27.3	**26.5**	25.6	**24.8**	58.6	**64.8**	33.3	**30.9**	FEW
	NONE	19.8	**41.0**	6.0	**6.7**	9.1	**9.2**	3.4	**3.2**	14.1	**7.2**	5.8	**4.8**	3.4	**4.7**	NONE

NOTE.–Average sample size was 3,977 for males, and 85 for females. However, there were slight variations from measure to measure due to missing data.

CAREER-RELATED PERSONAL CHARACTERISTICS (SELF-ESTIMATES)

		Academic Motivation		Work Motivation		Artistic Ability		Clerical Ability		English Ability		Math Ability		Mechanical Ability		Scientific Ability		Social Self-Confidence		Working with People		
MALES	TT	5.6	**5.8**	11.9	**12.5**	4.1	**4.1**	2.5	**2.8**	2.3	**2.4**	3.6	**3.9**	15.4	**12.6**	1.7	**2.0**	4.0	**4.5**	11.8	**11.9**	TT
	AA	26.6	**29.2**	47.9	**48.7**	17.2	**17.7**	12.7	**15.8**	12.0	**14.3**	19.2	**21.0**	48.4	**43.6**	10.1	**12.1**	17.2	**20.2**	41.1	**42.4**	AA
	A	60.3	**58.9**	38.5	**37.2**	37.5	**37.5**	53.4	**54.0**	55.9	**56.6**	52.8	**50.6**	33.4	**37.5**	46.8	**49.1**	56.2	**55.6**	43.5	**42.7**	A
	BA	7.4	**6.1**	1.8	**1.6**	41.2	**40.8**	31.4	**27.3**	29.8	**26.6**	24.4	**24.6**	2.8	**6.2**	41.4	**36.7**	22.5	**19.8**	3.6	**3.1**	BA
FEMALES	TT	4.2	**9.2**	11.7	**14.4**	9.4	**3.4**	9.5	**5.2**	2.1	**4.5**	3.1	**2.0**	5.3	**1.1**	3.1	**1.2**	7.3	**5.9**	15.6	**12.2**	TT
	AA	39.6	**37.1**	51.1	**50.7**	19.8	**18.5**	15.8	**25.9**	21.0	**24.1**	14.6	**11.3**	14.7	**9.4**	9.4	**7.7**	28.1	**23.9**	41.7	**45.6**	AA
	A	51.0	**51.0**	35.1	**33.6**	46.9	**43.1**	57.9	**54.2**	61.0	**59.9**	50.0	**47.5**	57.9	**45.3**	50.0	**47.7**	45.8	**57.2**	37.5	**40.5**	A
	BA	5.2	**2.6**	2.1	**1.3**	24.0	**35.0**	16.8	**14.7**	15.8	**11.5**	32.3	**39.2**	22.1	**44.2**	37.5	**43.4**	18.8	**12.9**	5.2	**1.6**	BA

NOTE.–TT = Top Ten Percent, AA = Above Average, A = Average, BA = Below Average.

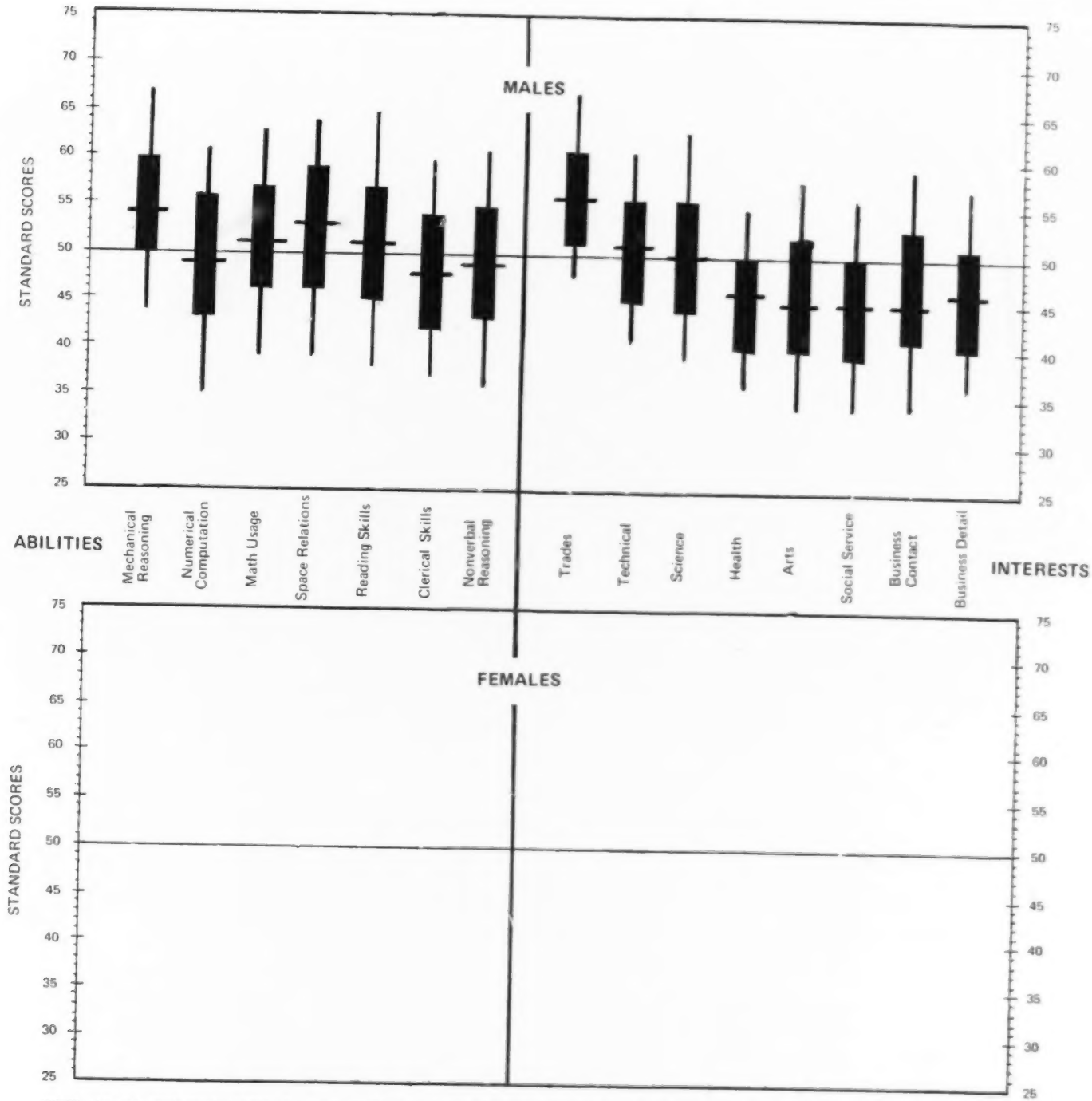
–Average sample size was 4,393 for males, and 96 for females. However, there were slight variations from measure to measure due to missing data.

GENERAL NOTE.–Shaded values represent corresponding percentages for the General Norm group.

–The data for females should be interpreted with caution because of the small sample size.

TECHNICAL-AGRICULTURE PRODUCTION

FIGURE 1 Profiles for Ability Measures and Vocational Interest Profile Scales



NOTE.–Average sample size for Abilities for males was 639. Average sample size for Interests for males was 624. However, for both Abilities and Interests there were slight variations from measure to measure due to missing data. The sample size was insufficient to provide a profile for females.

TECHNICAL-AGRICULTURE PRODUCTION

TABLE 1 Percentage Distribution for H.S. Grades, Career-Related Competencies, and Personal Characteristics

HIGH SCHOOL GRADES

		ENGLISH		MATH		SOCIAL STUDIES		NATURAL SCIENCES		BUSINESS		VOCATIONAL		
MALES	A	3.7	4.0	4.2	6.9	8.1	8.1	5.4	6.3	10.6	12.3	34.7	31.8	A
	B	28.2	25.7	23.6	24.1	37.0	32.8	32.2	28.8	36.6	36.8	45.0	42.8	B
	C	56.0	54.3	46.0	47.9	45.4	47.8	46.6	49.8	43.2	42.0	17.5	22.5	C
	D	11.5	14.8	22.4	18.3	9.1	10.5	15.4	13.8	8.5	7.6	2.6	2.5	D
	F	0.6	1.3	3.8	2.8	0.3	0.8	0.4	1.4	1.1	1.3	0.2	0.4	F
	NT	1.3	2.6	1.6	4.3	2.5	5.9	8.6	10.5	39.6	42.0	25.0	31.6	NT
FEMALES	A		17.4		9.3		17.7		11.1		27.4		38.0	A
	B		48.4		31.4		42.6		37.8		43.9		44.6	B
	C		31.1		45.5		35.3		43.4		25.8		16.6	C
	D		2.9		12.7		4.2		7.1		2.6		0.7	D
	F		0.2		1.2		0.2		0.6		0.3		0.1	F
	NT		1.6		4.1		4.0		8.3		18.7		38.1	NT

NOTE.–NT = Not Taken. Percentages for NT are based on *total group*. Percentages for letter grades are based on those students who took that course. Therefore, A–F = 100%.

–Average sample size was 629 for males. However, there were slight variations from measure to measure due to missing data.

CAREER-RELATED COMPETENCIES

		TRADES		TECHNICAL		SCIENCE		ARTS		SOC. SERVICE		BUS. CONTACT		BUS. DETAIL		
MALES	MANY	11.3	16.2	10.6	14.2	10.2	9.4	3.7	5.4	4.9	6.0	10.0	14.6	1.9	4.2	MANY
	SOME	62.9	57.9	64.2	56.9	47.4	45.4	31.8	32.8	36.1	34.8	33.5	36.4	32.1	39.1	SOME
	FEW	25.5	24.8	25.2	28.5	38.6	39.2	47.1	45.4	36.9	35.7	55.3	47.4	51.1	45.9	FEW
	NONE	0.3	1.2	0.0	0.4	3.8	6.0	17.4	16.4	22.1	23.5	1.2	1.6	14.9	10.9	NONE
FEMALES	MANY		1.1		0.8		5.1		17.1		14.6		5.3		13.4	MANY
	SOME		5.7		14.7		36.3		53.2		53.4		25.1		51.0	SOME
	FEW		52.2		77.7		49.3		26.5		24.8		64.8		30.9	FEW
	NONE		41.0		6.7		9.2		3.2		7.2		4.8		4.7	NONE

NOTE.–Average sample size was 593 for males. However, there were slight variations from measure to measure due to missing data.

CAREER-RELATED PERSONAL CHARACTERISTICS (SELF-ESTIMATES)

		Academic Motivation		Work Motivation		Artistic Ability		Clerical Ability		English Ability		Math Ability		Mechanical Ability		Scientific Ability		Social Self-Confidence		Working with People		
MALES	TT	2.6	5.8	11.1	12.5	2.6	4.1	1.9	2.8	1.7	2.4	2.3	3.9	10.6	12.6	1.4	2.0	3.7	4.5	10.3	11.9	TT
	AA	28.2	29.2	51.6	48.7	14.0	17.7	13.8	15.8	13.8	14.3	16.7	21.0	45.2	43.6	12.3	12.1	19.7	20.2	43.4	42.4	AA
	A	62.6	58.9	36.1	37.2	37.1	37.5	54.2	54.0	56.1	56.6	49.1	50.6	38.7	37.5	50.1	49.1	54.1	55.6	44.0	42.7	A
	BA	6.6	6.1	1.2	1.6	46.2	40.8	30.1	27.3	28.4	26.6	31.8	24.6	5.5	6.2	36.2	36.7	22.5	19.8	2.3	3.1	BA
FEMALES	TT		9.2		14.4		3.4		5.2		4.5		2.0		1.1		1.2		5.9		12.2	TT
	AA		37.1		50.7		18.5		25.9		24.1		11.3		9.4		7.7		23.9		45.6	AA
	A		51.0		33.6		43.1		54.2		59.9		47.5		45.3		47.7		57.2		40.5	A
	BA		2.6		1.3		35.0		14.7		11.5		39.2		44.2		43.4		12.9		1.6	BA

NOTE.–TT = Top Ten Percent, AA = Above Average, A = Average, BA = Below Average.

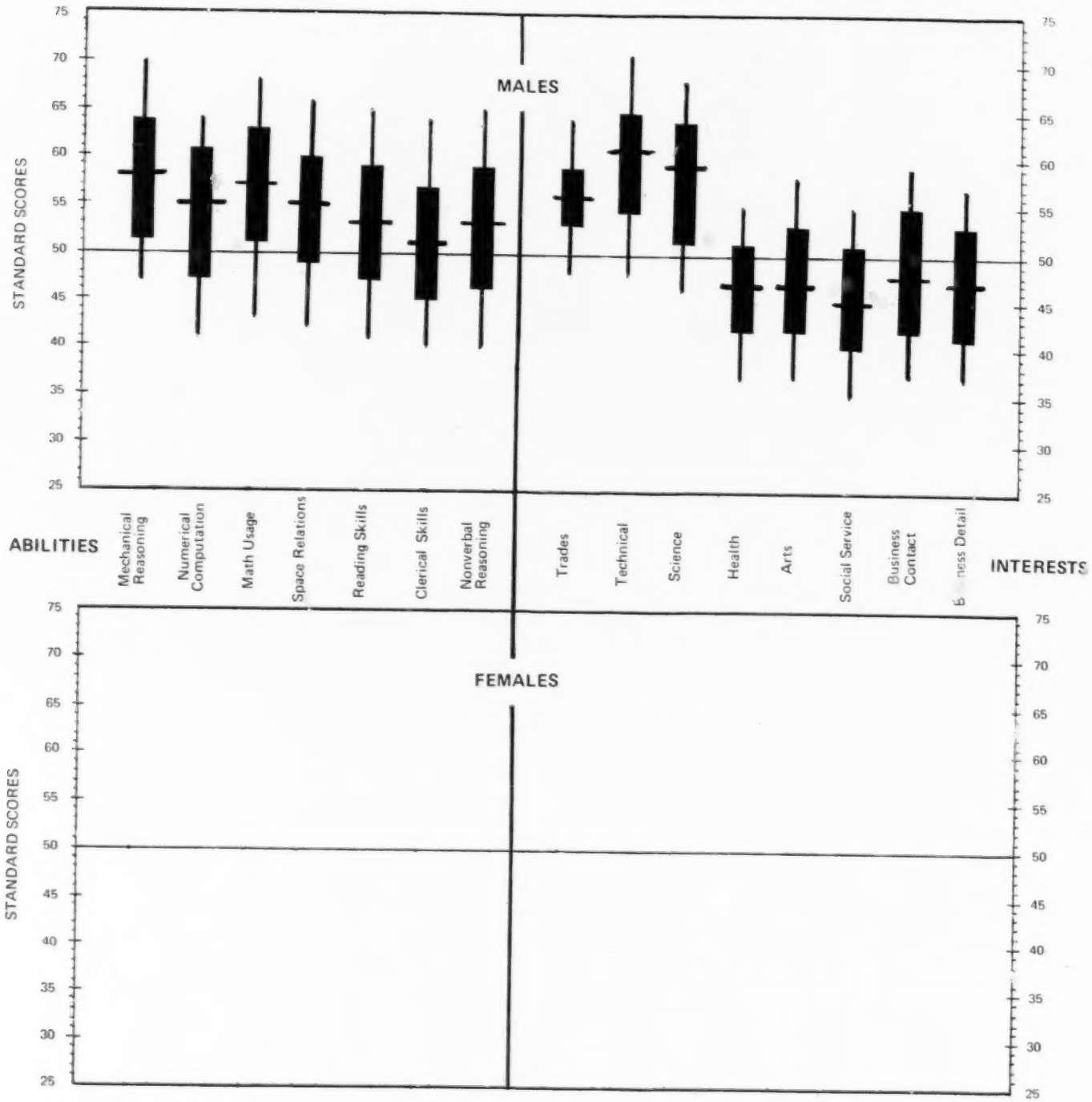
–Average sample size was 640 for males. However, there were slight variations from measure to measure due to missing data.

GENERAL NOTE.–Shaded values represent corresponding percentages for the General Norm group.

–The sample size was insufficient to provide data for females.

TECHNICAL-ENGINEERING APPLICATIONS

FIGURE 1 Profiles for Ability Measures and Vocational Interest Profile Scales



NOTE.–Average sample size for Abilities for males was 1,667. Average sample size for Interests for males was 1,645. However, for both Abilities and Interests there were slight variations from measure to measure due to missing data. The sample size was insufficient to provide a profile for females.

TECHNICAL-ENGINEERING APPLICATIONS

TABLE 1 Percentage Distribution for H.S. Grades, Career-Related Competencies, and Personal Characteristics

HIGH SCHOOL GRADES

	ENGLISH		MATH		SOCIAL STUDIES		NATURAL SCIENCES		BUSINESS		VOCATIONAL	
MALES A	5.3	4.0	10.4	6.9	11.0	8.1	10.0	6.3	12.6	12.3	39.6	31.8
B	30.4	25.7	29.2	24.1	34.9	32.8	35.0	28.8	40.4	36.8	39.9	42.8
C	51.6	54.3	46.1	47.9	45.8	47.8	46.3	49.8	41.3	42.0	18.8	22.5
D	11.9	14.8	11.6	18.3	7.9	10.5	7.7	13.8	5.5	7.6	1.5	2.5
F	0.9	1.3	2.7	2.8	0.3	0.8	1.1	1.4	0.2	1.3	0.2	0.4
NT	1.4	2.6	2.2	4.3	4.1	5.9	7.4	10.5	46.6	42.0	33.6	31.6
FEMALES A		17.4		9.3		17.7		11.1		27.4		38.0
B		48.4		31.4		42.6		37.8		43.9		44.6
C		31.1		45.5		35.3		43.4		25.8		16.6
D		2.9		12.7		4.2		7.1		2.6		0.7
F		0.2		1.2		0.2		0.6		0.3		0.1
NT		1.6		4.1		4.0		8.3		18.7		38.1

NOTE.–NT = Not Taken. Percentages for NT are based on *total group*. Percentages for letter grades are based on those students who took that course. Therefore, A – F = 100%.

–Average sample size was 1,641 for males. However, there were slight variations from measure to measure due to missing data.

CAREER-RELATED COMPETENCIES

	TRADES		TECHNICAL		SCIENCE		ARTS		SOC. SERVICE		BUS. CONTACT		BUS. DETAIL	
MALES MANY	23.1	16.2	24.4	14.2	16.8	9.4	3.9	5.4	3.8	6.0	13.6	14.6	2.6	4.2
SOME	60.0	57.9	60.0	56.9	56.1	45.4	33.5	32.8	33.5	34.8	36.9	36.4	41.2	39.1
FEW	16.2	24.8	15.5	28.5	25.0	39.2	48.1	45.4	38.5	35.7	48.6	47.4	47.4	45.9
NONE	0.7	1.2	0.2	0.4	2.1	6.0	14.5	16.4	24.3	23.5	1.0	1.6	8.8	10.9
FEMALES MANY		1.1		0.8		5.1		17.1		14.6		5.3		13.4
SOME		5.7		14.7		36.3		53.2		53.4		25.1		51.0
FEW		52.2		77.7		49.3		26.5		24.8		64.8		30.9
NONE		41.0		6.7		9.2		3.2		7.2		4.8		4.7

NOTE.–Average sample size was 1,573 for males. However, there were slight variations from measure to measure due to missing data.

CAREER-RELATED PERSONAL CHARACTERISTICS (SELF-ESTIMATES)

	Academic Motivation		Work Motivation		Artistic Ability		Clerical Ability		English Ability		Math Ability		Mechanical Ability		Scientific Ability		Social Self-Confidence		Working with People	
MALES TT	7.3	5.8	12.2	12.5	4.5	4.1	1.7	2.8	2.5	2.4	6.5	3.9	17.0	12.6	3.8	2.0	3.2	4.5	10.5	11.9
AA	35.1	29.2	50.7	48.7	20.5	17.7	15.6	15.8	14.6	14.3	31.0	21.0	50.1	43.6	21.0	12.1	20.2	20.2	43.6	42.4
A	53.6	58.9	36.0	37.2	38.3	37.5	56.0	54.0	57.7	56.6	47.2	50.6	29.8	37.5	54.2	49.1	57.2	55.6	43.1	42.7
BA	4.0	6.1	1.1	1.6	36.8	40.8	26.7	27.3	25.2	26.6	15.3	24.6	3.1	6.2	21.0	36.7	19.4	19.8	2.8	3.1
FEMALES TT		9.2		14.4		3.4		5.2		4.5		2.0		1.1		1.2		5.9		12.2
AA		37.1		50.7		18.5		25.9		24.1		11.3		9.4		7.7		23.9		45.6
A		51.0		33.6		43.1		54.2		59.9		47.5		45.3		47.7		57.2		40.5
BA		2.6		1.3		35.0		14.7		11.5		39.2		44.2		43.4		12.9		1.6

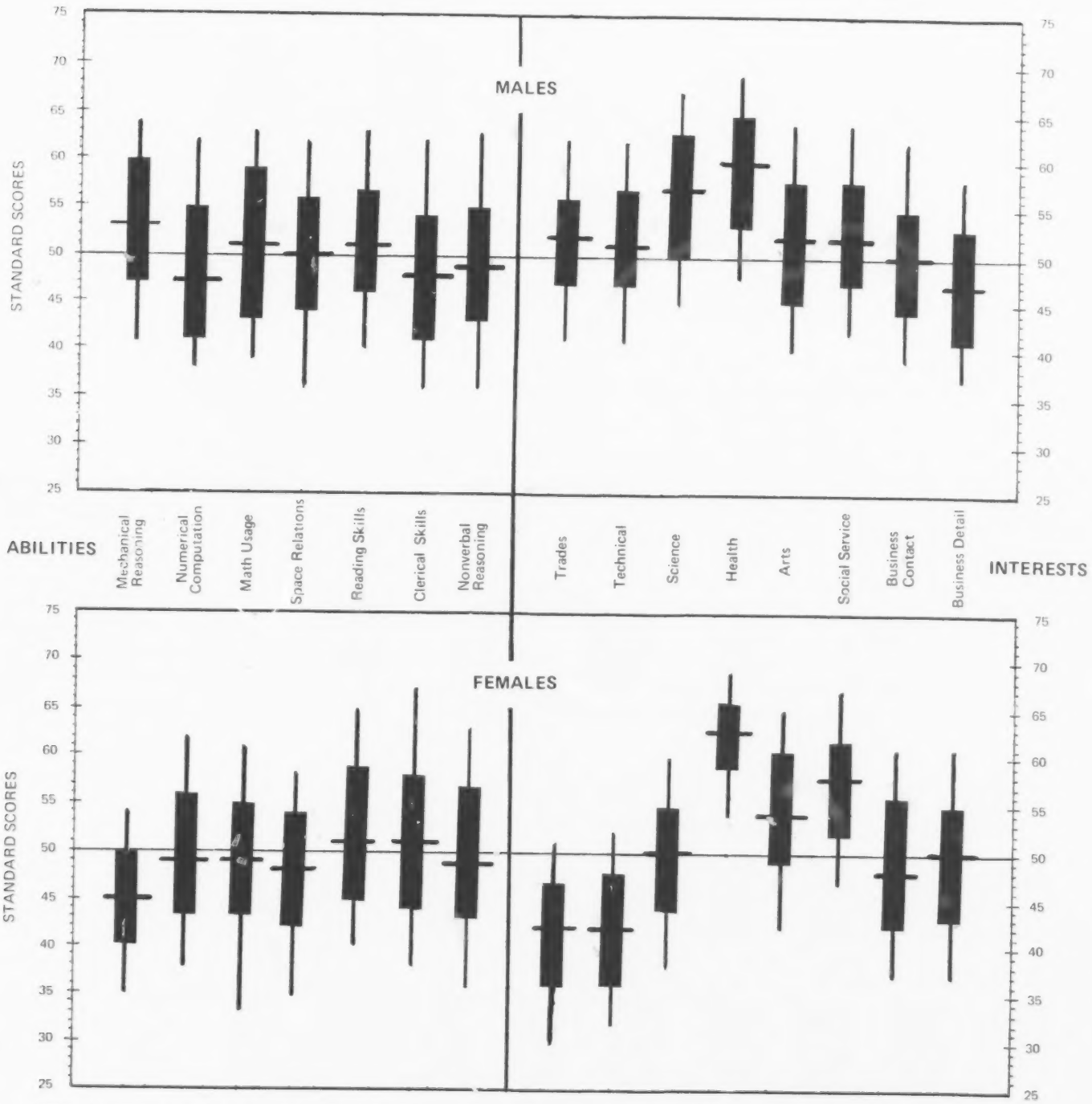
NOTE.–TT = Top Ten Percent, AA = Above Average, A = Average, BA = Below Average.

–Average sample size was 1,665 for males. However, there were slight variations from measure to measure due to missing data.

GENERAL NOTE.–Shaded values represent corresponding percentages for the General Norm group.

–The sample size was insufficient to provide data for females.

Figure 1 Profiles for Ability Measures and Vocational Interest Profile Scales



NOTE.—Average sample size for Abilities was 253 for males, and 2,469 for females. For Interests the average sample size was 241 for males, and 2,448 for females. However, for both Abilities and Interests there were slight variations from measure to measure due to missing data.

TABLE 1 Percentage Distribution for H.S. Grades, Career-Related Competencies, and Personal Characteristics

HIGH SCHOOL GRADES

		ENGLISH		MATH		SOCIAL STUDIES		NATURAL SCIENCES		BUSINESS		VOCATIONAL		
MALES	A	3.3	4.0	6.2	6.9	11.4	8.1	10.6	6.3	10.6	12.3	23.0	31.8	A
	B	32.8	25.7	22.7	24.1	36.9	32.8	30.5	28.8	40.9	36.8	48.9	42.8	B
	C	53.3	54.3	46.3	47.9	44.9	47.8	50.0	49.8	40.2	42.0	24.4	22.5	C
	D	9.4	14.8	22.3	18.3	6.4	10.5	8.0	13.8	6.1	7.6	3.0	2.5	D
	F	1.2	1.3	2.5	2.8	0.4	0.8	0.9	1.4	2.3	1.3	0.7	0.4	F
	NT	1.6	2.6	2.8	4.3	4.4	5.9	8.1	10.5	45.0	42.0	44.4	31.6	NT
FEMALES	A	18.2	17.4	8.6	9.3	17.4	17.7	12.4	11.1	25.3	27.4	37.8	38.0	A
	B	49.4	48.4	32.6	31.4	43.9	42.6	39.7	37.8	43.8	43.9	45.3	44.6	B
	C	30.1	31.1	47.7	45.5	35.6	35.3	42.2	43.4	28.4	25.8	16.3	16.6	C
	D	2.2	2.9	10.3	12.7	3.1	4.2	5.3	7.1	2.1	2.6	0.6	0.7	D
	F	0.1	0.2	0.8	1.2	0.1	0.2	0.3	0.6	0.4	0.3	0.1	0.1	F
	NT	1.7	1.6	3.9	4.1	3.4	4.0	7.8	8.3	24.4	18.7	40.0	38.1	NT

NOTE.–NT = Not Taken. Percentages for NT are based on *total group*. Percentages for letter grades are based on those students who took that course. Therefore, A - F = 100%.

–Average sample size was 246 for males, and 2,441 for females. However, there were slight variations from measure to measure due to missing data.

CAREER-RELATED COMPETENCIES

		TRADES		TECHNICAL		SCIENCE		ARTS		SOC. SERVICE		BUS. CONTACT		BUS. DETAIL		
MALES	MANY	14.0	16.2	18.4	14.2	18.3	9.4	8.6	5.4	10.9	6.0	15.4	14.6	6.1	4.2	MANY
	SOME	47.1	57.9	55.6	56.9	55.0	45.4	40.2	32.8	45.5	34.8	37.8	36.4	40.0	39.1	SOME
	FEW	34.7	24.8	25.6	28.5	24.2	39.2	42.3	45.4	34.2	35.7	44.2	47.4	46.5	45.9	FEW
	NONE	4.1	1.2	0.4	0.4	2.5	6.0	9.0	16.4	9.4	23.5	2.6	1.6	7.4	10.9	NONE
FEMALES	MANY	1.4	1.1	1.3	0.8	8.2	5.1	19.2	17.1	19.2	14.6	5.4	5.3	11.3	13.4	MANY
	SOME	6.3	5.7	21.7	14.7	47.7	36.3	53.6	53.2	56.3	53.4	27.1	25.1	46.8	51.0	SOME
	FEW	57.1	52.2	75.0	77.7	41.2	49.3	24.9	26.5	20.1	24.8	64.3	64.8	36.4	30.9	FEW
	NONE	35.2	41.0	2.0	6.7	2.9	9.2	2.3	3.2	4.4	7.2	3.2	4.8	5.4	4.7	NONE

NOTE.–Average sample size was 231 for males, and 2,300 for females. However, there were slight variations from measure to measure due to missing data.

CAREER-RELATED PERSONAL CHARACTERISTICS (SELF-ESTIMATES)

		Academic Motivation		Work Motivation		Artistic Ability		Clerical Ability		English Ability		Math Ability		Mechanical Ability		Scientific Ability		Social Self-Confidence		Working with People		
MALES	TT	7.5	5.8	14.3	12.5	3.2	4.1	2.0	2.8	2.4	2.4	4.4	3.9	9.5	12.6	5.1	2.0	6.0	4.5	15.3	11.9	TT
	AA	36.2	29.2	55.0	48.7	23.4	17.7	14.6	15.8	21.6	14.3	16.2	21.0	36.4	43.6	23.7	12.1	33.3	20.2	46.7	42.4	AA
	A	52.4	58.9	29.1	37.2	39.3	37.5	56.7	54.0	59.2	56.6	51.4	50.6	38.7	37.5	56.9	49.1	47.6	55.6	34.9	42.7	A
	BA	3.9	6.1	1.6	1.6	34.1	40.8	26.8	27.3	16.9	26.6	28.1	24.6	15.4	6.2	14.2	36.7	13.1	19.8	3.1	3.1	BA
FEMALES	TT	11.2	9.2	15.4	14.4	2.2	3.4	2.5	5.2	5.0	4.5	1.5	2.0	1.3	1.1	1.2	1.2	6.0	5.9	11.6	12.2	TT
	AA	42.1	37.1	55.2	50.7	17.6	18.5	21.3	25.9	26.7	24.1	11.0	11.3	10.0	9.4	11.5	7.7	25.6	23.9	46.8	45.6	AA
	A	44.8	51.0	28.4	33.6	45.2	43.1	55.0	54.2	58.6	59.9	47.9	47.5	48.4	45.3	59.5	47.7	56.9	57.2	40.5	40.5	A
	BA	1.9	2.6	0.9	1.3	35.1	35.0	21.2	14.7	9.8	11.5	39.6	39.2	40.2	44.2	27.7	43.4	11.5	12.9	1.1	1.6	BA

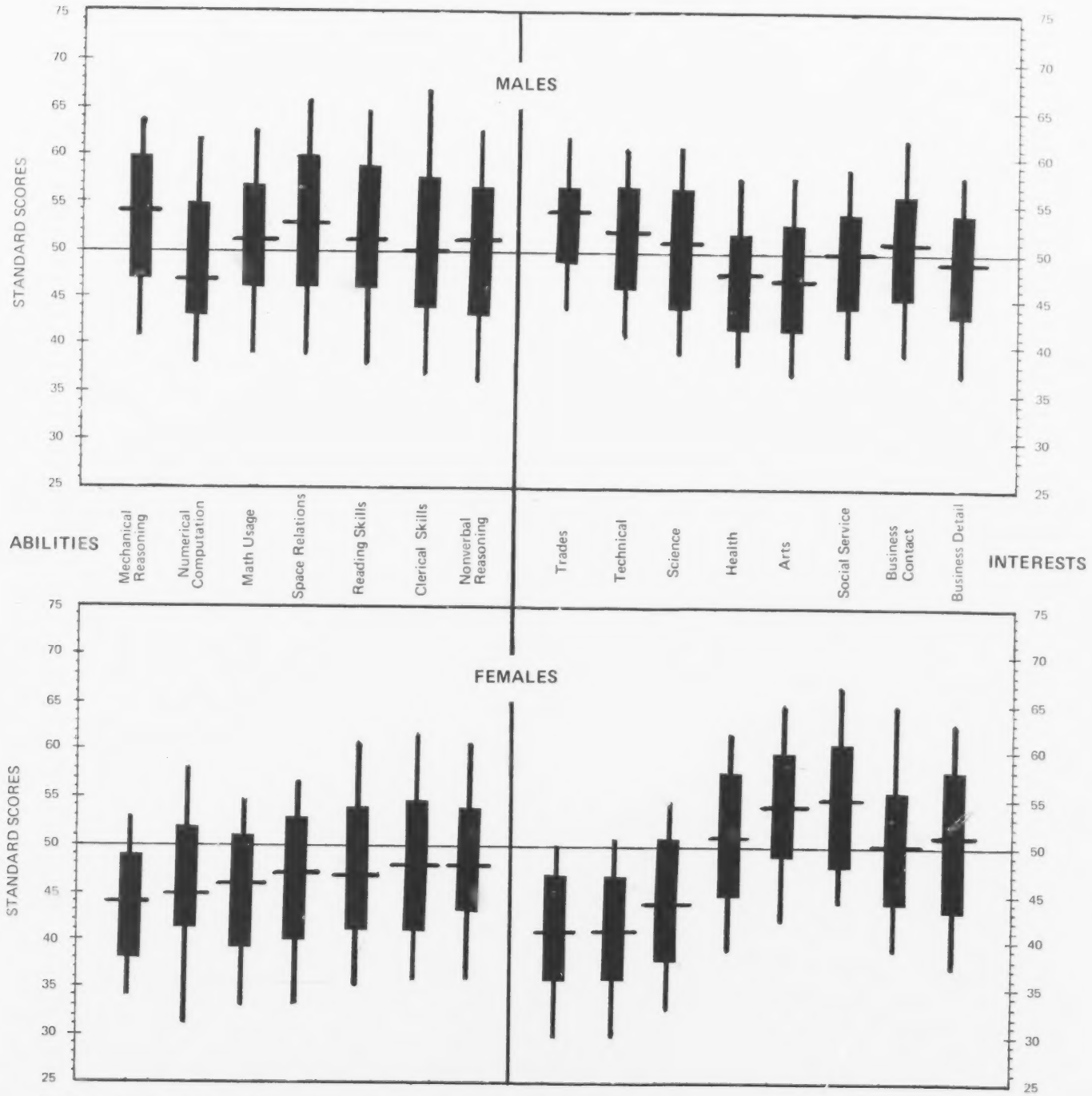
NOTE.–TT = Top Ten Percent, AA = Above Average, A = Average, BA = Below Average.

–Average sample size was 253 for males, and 2,466 for females. However, there were slight variations from measure to measure due to missing data.

GENERAL NOTE.–Shaded values represent corresponding percentages for the General Norm group.

SOCIAL SCIENCE & PUBLIC SERVICE (Vocational-Technical Programs)

FIGURE 1 Profiles for Ability Measures and Vocational Interest Profile Scales



NOTE.–Average sample size for Abilities was 420 for males, and 337 for females. For Interests the average sample size was 415 for males, and 331 for females. However, for both Abilities and Interests there were slight variations from measure to measure due to missing data.

SOCIAL SCIENCE & PUBLIC SERVICE (Vocational-Technical Programs)

TABLE 1 Percentage Distribution for H.S. Grades, Career-Related Competencies, and Personal Characteristics

HIGH SCHOOL GRADES

		ENGLISH		MATH		SOCIAL STUDIES		NATURAL SCIENCES		BUSINESS		VOCATIONAL		
MALES	A	3.2	4.0	5.5	6.9	6.0	8.1	4.5	6.3	5.7	12.3	24.2	31.8	A
	B	27.8	25.7	24.6	24.1	36.9	32.8	26.7	28.8	38.5	36.8	43.1	42.8	B
	C	55.1	54.3	48.5	47.9	49.1	47.8	55.6	49.8	48.4	42.0	29.5	22.5	C
	D	13.2	14.8	18.1	18.3	7.7	10.5	13.2	13.8	5.3	7.6	2.5	2.5	D
	F	0.7	1.3	3.3	2.8	0.2	0.8	0.0	1.4	2.0	1.3	0.7	0.4	F
	NT	3.1	2.6	4.3	4.3	3.4	5.9	13.4	10.5	39.9	42.0	31.1	31.6	NT
FEMALES	A	17.5	17.4	5.6	9.3	15.5	17.7	9.2	11.1	22.4	27.4	40.9	38.0	A
	B	39.9	48.4	28.0	31.4	35.6	42.6	32.1	37.8	35.5	43.9	44.1	44.6	B
	C	34.4	31.1	47.2	45.5	39.6	35.3	45.4	43.4	35.9	25.8	14.1	16.6	C
	D	7.4	2.9	17.7	12.7	8.9	4.2	9.9	7.1	5.4	2.6	0.4	0.7	D
	F	0.9	0.2	1.6	1.2	0.3	0.2	3.4	0.6	0.8	0.3	0.4	0.1	F
	NT	1.8	1.6	3.0	4.1	7.6	4.0	10.1	8.3	20.6	18.7	31.9	38.1	NT

NOTE.–NT = Not Taken. Percentages for NT are based on *total group*. Percentages for letter grades are based on those students who took that course. Therefore, A + B + C + D + F = 100%.

–Average sample size was 412 for males, and 328 for females. However, there were slight variations from measure to measure due to missing data.

CAREER-RELATED COMPETENCIES

		TRADES		TECHNICAL		SCIENCE		ARTS		SOC. SERVICE		BUS. CONTACT		BUS. DETAIL		
MALES	MANY	14.7	16.2	12.7	14.2	6.6	9.4	5.3	5.4	13.3	6.0	20.4	14.6	6.7	4.2	MANY
	SOME	57.5	57.9	58.2	56.9	50.0	45.4	34.0	32.8	45.2	34.8	36.1	36.4	48.0	39.1	SOME
	FEW	25.7	24.8	28.3	28.5	37.8	39.2	45.9	45.4	26.6	35.7	42.2	47.4	38.0	45.9	FEW
	NONE	2.2	1.2	0.8	0.4	5.6	6.0	14.7	16.4	15.0	23.5	1.3	1.6	7.4	10.9	NONE
FEMALES	MANY	0.7	1.1	0.7	0.8	3.9	5.1	17.8	17.1	15.2	14.6	4.8	5.3	11.2	13.4	MANY
	SOME	7.6	5.7	13.2	14.7	30.7	36.3	55.9	53.2	56.5	53.4	26.0	25.1	45.8	51.0	SOME
	FEW	57.6	52.2	79.9	77.7	56.5	49.3	24.4	26.5	21.9	24.8	65.7	64.8	36.9	30.9	FEW
	NONE	34.2	41.0	6.2	6.7	8.8	9.2	1.9	3.2	6.4	7.2	3.5	4.8	6.1	4.7	NONE

NOTE.–Average sample size was 389 for males, and 303 for females. However, there were slight variations from measure to measure due to missing data.

CAREER-RELATED PERSONAL CHARACTERISTICS (SELF-ESTIMATES)

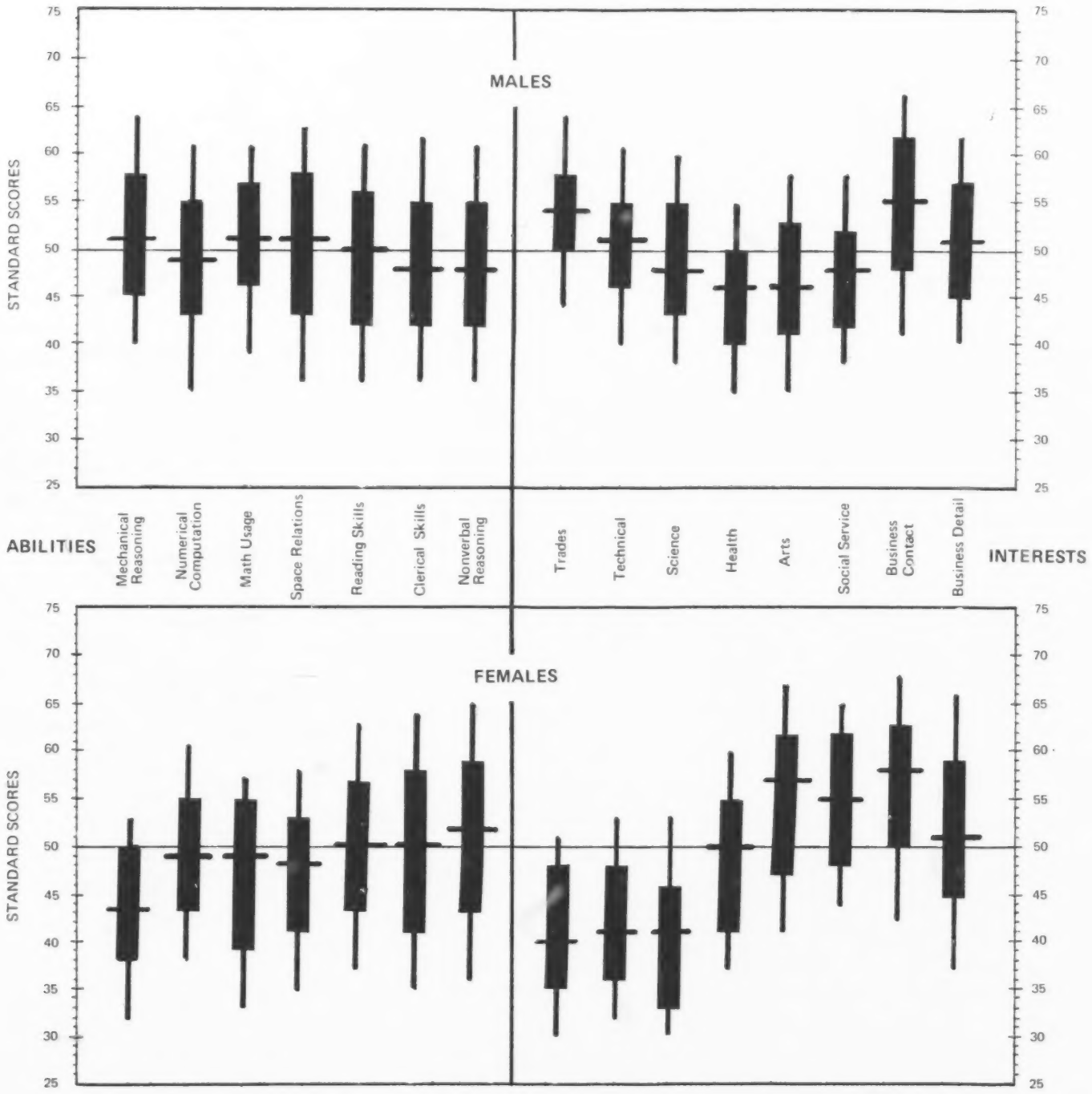
		Academic Motivation		Work Motivation		Artistic Ability		Clerical Ability		English Ability		Math Ability		Mechanical Ability		Scientific Ability		Social Self-Confidence		Working with People		
MALES	TT	5.5	5.8	15.6	12.5	3.8	4.1	4.1	2.8	2.6	2.4	2.4	3.9	8.1	12.6	1.2	2.0	6.7	4.5	12.9	11.9	TT
	AA	28.8	29.2	51.3	48.7	12.5	17.7	18.9	15.8	16.5	14.3	15.8	21.0	38.2	43.6	9.3	12.1	23.8	20.2	46.4	42.4	AA
	A	62.4	58.9	31.2	37.2	34.3	37.5	53.1	54.0	59.4	56.6	46.4	50.6	43.4	37.5	48.7	49.1	55.7	55.6	37.6	42.7	A
	BA	3.3	6.1	1.9	1.6	49.4	40.8	23.9	27.3	21.5	26.6	35.4	24.6	10.3	6.2	40.8	36.7	13.8	19.8	3.1	3.1	BA
FEMALES	TT	9.2	9.2	14.2	14.4	4.5	3.4	6.2	5.2	4.8	4.5	1.8	2.0	0.6	1.1	0.6	1.2	5.4	5.9	12.5	12.2	TT
	AA	32.4	37.1	48.2	50.7	18.8	18.5	19.3	25.9	18.4	24.1	7.4	11.3	7.5	9.4	5.6	7.7	25.1	23.9	44.5	45.6	AA
	A	54.8	51.0	35.5	33.6	41.8	43.1	54.9	54.2	61.4	59.9	41.8	47.5	46.3	45.3	42.7	47.7	56.4	57.2	40.4	40.5	A
	BA	3.6	2.6	2.1	1.3	34.9	35.0	19.6	14.7	15.4	11.5	49.0	39.2	45.7	44.2	51.0	43.4	13.1	12.9	2.7	1.6	BA

NOTE.–TT = Top Ten Percent, AA = Above Average, A = Average, BA = Below Average.

–Average sample size was 419 for males, and 336 for females. However, there were slight variations from measure to measure due to missing data.

GENERAL NOTE.–Shaded values represent corresponding percentages for the General Norm group.

FIGURE 1 Profiles for Ability Measures and Vocational Interest Profile Scales



NOTE.–Average sample size for Abilities was 489 for males, and 132 for females. For Interests the average sample size was 476 for males, and 131 for females. However, for both Abilities and Interests there were slight variations from measure to measure due to missing data.

BUSINESS CONTACT & MARKETING

TABLE 1 Percentage Distribution for H.S. Grades, Career-Related Competencies, and Personal Characteristics

HIGH SCHOOL GRADES

		ENGLISH		MATH		SOCIAL STUDIES		NATURAL SCIENCES		BUSINESS		VOCATIONAL		
MALES	A	2.9	4.0	5.1	6.9	8.6	8.1	6.0	6.3	13.0	12.3	38.0	31.8	A
	B	26.1	25.7	19.7	24.1	30.3	32.8	26.1	28.8	41.0	36.8	37.4	42.8	B
	C	56.9	54.3	52.1	47.9	50.8	47.8	53.1	49.8	40.1	42.0	21.5	22.5	C
	D	13.7	14.8	20.9	18.3	9.4	10.5	13.9	13.8	5.4	7.6	2.8	2.5	D
	F	0.4	1.3	2.1	2.8	0.8	0.8	0.9	1.4	0.6	1.3	0.3	0.4	F
	NT	1.0	2.6	3.7	4.3	3.5	5.9	6.6	10.5	30.2	42.0	33.0	31.6	NT
FEMALES	A	16.0	17.4	8.7	9.3	14.3	17.7	5.8	11.1	22.1	27.4	43.5	38.0	A
	B	42.8	48.4	26.2	31.4	40.5	42.6	36.7	37.8	36.5	43.9	43.5	44.6	B
	C	36.6	31.1	42.1	45.5	37.3	35.3	53.3	43.4	37.5	25.8	11.8	16.6	C
	D	4.6	2.9	20.6	12.7	7.9	4.2	2.5	7.1	3.8	2.6	1.2	0.7	D
	F	0.0	0.2	2.4	1.2	0.0	0.2	1.7	0.6	0.0	0.3	0.0	0.1	F
	NT	2.2	1.6	5.3	4.1	5.3	4.0	9.8	8.3	21.8	18.7	35.1	38.1	NT

NOTE.–NT = Not Taken. Percentages for NT are based on *total group*. Percentages for letter grades are based on those students who took that course. Therefore, A – F = 100%.

–Average sample size was 483 for males, and 133 for females. However, there were slight variations from measure to measure due to missing data.

CAREER-RELATED COMPETENCIES

		TRADES		TECHNICAL		SCIENCE		ARTS		SOC. SERVICE		BUS. CONTACT		BUS. DETAIL		
MALES	MANY	10.8	16.2	9.8	14.2	5.4	9.4	6.1	5.4	12.6	6.0	21.5	14.6	5.2	4.2	MANY
	SOME	52.7	57.9	50.4	56.9	40.6	45.4	34.4	32.8	46.3	34.8	41.4	36.4	43.7	39.1	SOME
	FEW	34.8	24.8	39.3	28.5	46.2	39.2	44.2	45.4	27.6	35.7	34.9	47.4	44.6	45.9	FEW
	NONE	1.7	1.2	0.4	0.4	7.8	6.0	15.3	16.4	13.6	23.5	2.2	1.6	6.5	10.9	NONE
FEMALES	MANY	0.8	1.1	0.9	0.8	4.1	5.1	15.0	17.1	16.4	14.6	13.5	5.3	8.0	13.4	MANY
	SOME	9.2	5.7	13.4	14.7	31.2	36.3	55.1	53.2	49.1	53.4	27.0	25.1	51.2	51.0	SOME
	FEW	41.7	52.2	72.3	77.7	46.7	49.3	28.4	26.5	28.4	24.8	56.4	64.8	37.6	30.9	FEW
	NONE	48.3	41.0	13.4	6.7	18.0	9.2	1.6	3.2	6.0	7.2	3.2	4.8	3.2	4.7	NONE

NOTE.–Average sample size was 446 for males, and 121 for females. However, there were slight variations from measure to measure due to missing data.

CAREER-RELATED PERSONAL CHARACTERISTICS (SELF-ESTIMATES)

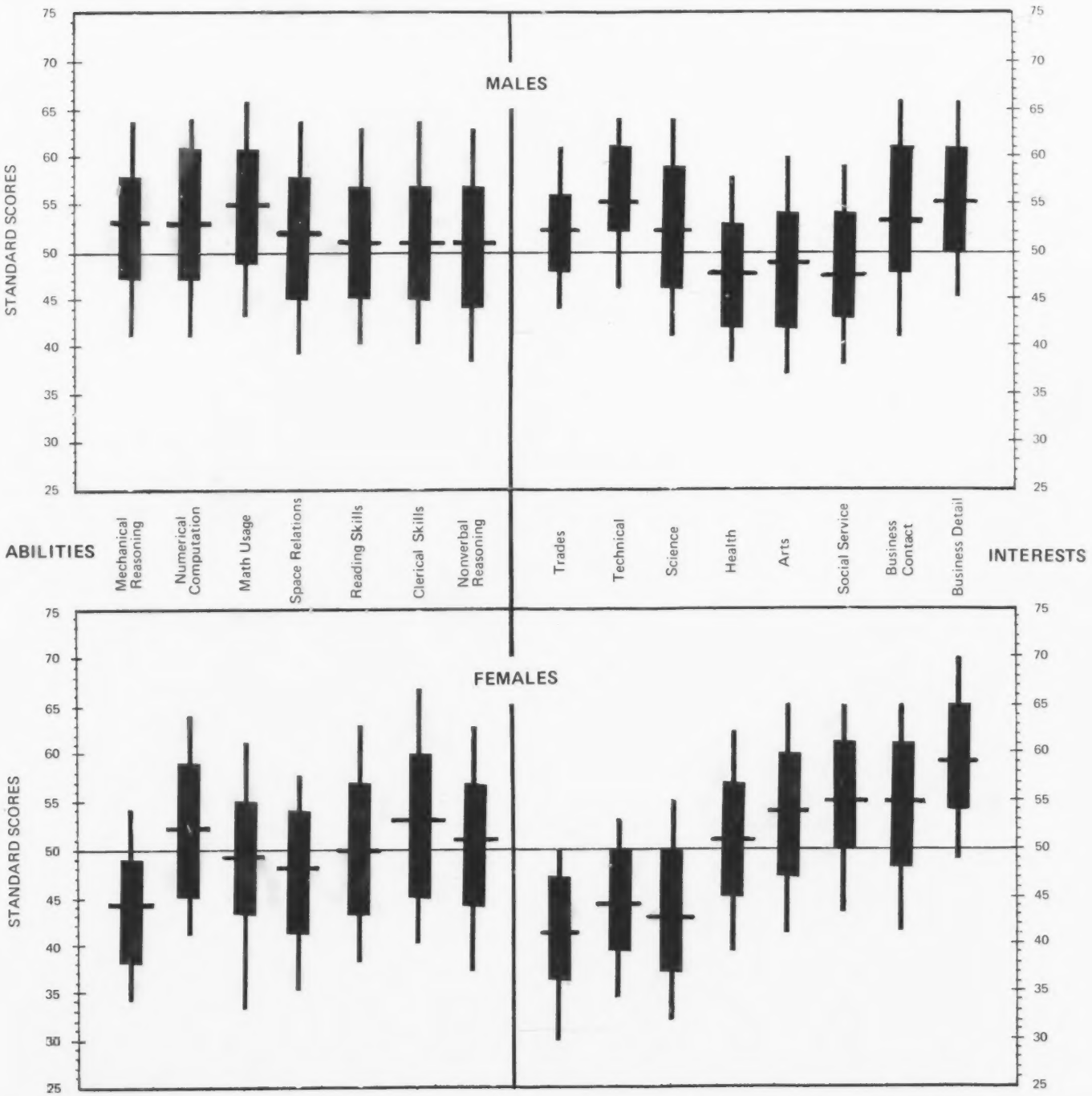
		Academic Motivation		Work Motivation		Artistic Ability		Clerical Ability		English Ability		Math Ability		Mechanical Ability		Scientific Ability		Social Self-Confidence		Working with People		
MALES	TT	4.3	5.8	17.2	12.5	3.9	4.1	3.7	2.8	1.4	2.4	1.8	3.9	9.8	12.6	1.4	2.0	7.4	4.5	14.3	11.9	TT
	AA	26.8	29.2	51.5	48.7	13.8	17.7	14.0	15.8	11.9	14.3	13.9	21.0	38.3	43.6	6.5	12.1	21.3	20.2	44.9	42.4	AA
	A	64.0	58.9	30.4	37.2	36.3	37.5	59.8	54.0	58.9	56.6	53.7	50.6	40.0	37.5	46.0	49.1	60.0	55.6	38.8	42.7	A
	BA	4.9	6.1	0.8	1.6	46.0	40.8	22.6	27.3	27.8	26.6	30.5	24.6	11.9	6.2	46.0	36.7	11.3	19.8	2.0	3.1	BA
FEMALES	TT	4.6	9.2	16.0	14.4	3.8	3.4	4.6	5.2	4.6	4.5	1.5	2.0	0.8	1.1	2.3	1.2	6.9	5.9	13.0	12.2	TT
	AA	30.8	37.1	48.8	50.7	27.5	18.5	20.6	25.9	19.8	24.1	8.4	11.3	9.9	9.4	1.5	7.7	26.7	23.9	53.4	45.6	AA
	A	61.5	51.0	33.6	33.6	39.7	43.1	57.2	54.2	65.6	59.9	42.0	47.5	41.2	45.3	38.2	47.7	55.7	57.2	32.8	40.5	A
	BA	3.1	2.6	1.5	1.3	29.0	35.0	17.6	14.7	9.9	11.5	48.1	39.2	48.1	44.2	58.0	43.4	10.7	12.9	0.8	1.6	BA

NOTE.–TT = Top Ten Percent, AA = Above Average, A = Average, BA = Below Average.

–Average sample size was 488 for males, and 131 for females. However, there were slight variations from measure to measure due to missing data.

GENERAL NOTE.–Shaded values represent corresponding percentages for the General Norm group.

FIGURE 1 Profiles for Ability Measures and Vocational Interest Profile Scales



NOTE.–Average sample size for Abilities was 1,019 for males, and 2,163 for females. For Interests the average sample size was 1,010 for males, and 2,142 for females. However, for both Abilities and Interests there were slight variations from measure to measure due to missing data.

BUSINESS DETAIL & OFFICE

TABLE 1 Percentage Distribution for H.S. Grades, Career-Related Competencies, and Personal Characteristics

HIGH SCHOOL GRADES

		ENGLISH		MATH		SOCIAL STUDIES		NATURAL SCIENCES		BUSINESS		VOCATIONAL		
MALES	A	5.6	4.0	9.1	6.9	11.1	8.1	6.6	6.3	19.8	12.3	24.3	31.8	A
	B	30.9	25.7	28.9	24.1	36.2	32.8	31.0	28.8	45.0	36.8	45.2	42.8	B
	C	51.6	54.3	44.5	47.9	44.8	47.8	48.3	49.8	30.4	42.0	26.3	22.5	C
	D	11.2	14.8	15.8	18.3	7.4	10.5	13.0	13.8	4.4	7.6	3.7	2.5	D
	F	0.7	1.3	1.6	2.8	0.5	0.8	1.1	1.4	0.4	1.3	0.5	0.4	F
	NT	1.1	2.6	2.8	4.3	3.7	5.9	7.4	10.5	29.8	42.0	41.7	31.6	NT
FEMALES	A	17.2	17.4	12.0	9.3	18.1	17.7	10.8	11.1	33.2	27.4	39.7	38.0	A
	B	48.9	48.4	32.8	31.4	42.6	42.6	37.3	37.8	44.7	43.9	43.7	44.6	B
	C	30.5	31.1	42.9	45.5	34.6	35.3	44.1	43.4	20.1	25.8	16.0	16.6	C
	D	3.2	2.9	11.5	12.7	4.6	4.2	7.4	7.1	1.9	2.6	0.6	0.7	D
	F	0.2	0.2	0.8	1.2	0.2	0.2	0.5	0.6	0.1	0.3	0.1	0.1	F
	NT	0.9	1.6	3.5	4.1	3.7	4.0	7.9	8.3	10.1	18.7	37.0	38.1	NT

NOTE.–NT = Not Taken. Percentages for NT are based on *total group*. Percentages for letter grades are based on those students who took that course. Therefore, A – F = 100%.

–Average sample size was 994 for males, and 2,100 for females. However, there were slight variations from measure to measure due to missing data.

CAREER-RELATED COMPETENCIES

		TRADES		TECHNICAL		SCIENCE		ARTS		SOC. SERVICE		BUS. CONTACT		BUS. DE[illegible]		
MALES	MANY	7.2	16.2	9.4	14.2	8.5	9.4	4.5	5.4	5.9	6.0	15.3	14.6	8.9	4.2	MANY
	SOME	50.0	57.9	48.0	56.9	45.0	45.4	35.8	32.8	37.0	34.8	39.0	36.4	58.6	39.1	SOME
	FEW	41.2	24.8	42.4	28.5	41.0	39.2	44.7	45.4	36.3	35.7	44.5	47.4	30.0	45.9	FEW
	NONE	1.6	1.2	0.2	0.4	5.5	6.0	14.9	16.4	20.7	23.5	1.2	1.6	2.5	[illegible]9	NONE
FEMALES	MANY	0.8	1.1	0.3	0.8	2.4	5.1	13.9	17.1	9.4	14.6	4.6	5.3	18.6	13.4	MANY
	SOME	3.7	5.7	7.7	14.7	26.4	36.3	52.7	53.2	49.7	53.4	24.1	25.1	59.1	51.0	SOME
	FEW	47.3	52.2	81.2	77.7	56.7	49.3	29.6	26.5	30.1	24.8	64.7	64.8	20.2	30.9	FEW
	NONE	48.2	41.0	10.9	6.7	14.5	9.2	3.8	3.2	10.9	7.2	6.6	4.8	2.1	4.7	NONE

NOTE.–Average sample size was 955 for males, and 1,996 for females. However, there were slight variations from measure to measure due to missing data.

CAREER-RELATED PERSONAL CHARACTERISTICS (SELF-ESTIMATES)

		Academic Motivation		Work Motivation		Artistic Ability		Clerical Ability		English Ability		Math Ability		Mechanical Ability		Scientific Ability		Social Self-Confidence		Working with People		
MALES	TT	7.3	5.8	13.3	12.5	3.8	4.1	5.5	2.8	3.3	2.4	5.5	3.9	6.4	12.6	1.5	2.0	4.0	4.5	12.3	11.9	TT
	AA	33.5	29.2	52.1	48.7	13.7	17.7	29.3	15.8	15.6	14.3	26.1	21.0	34.2	43.6	10.0	12.1	22.9	20.2	44.3	42.4	AA
	A	55.8	58.9	33.7	37.2	38.5	37.5	52.2	54.0	58.7	56.6	51.0	50.6	48.0	37.5	47.8	49.1	55.2	55.6	41.1	42.7	A
	BA	3.4	6.1	0.9	1.6	44.0	40.8	13.0	27.3	22.4	26.6	17.4	24.6	11.4	6.2	40.7	36.7	17.8	19.8	2.4	3.1	BA
FEMALES	TT	8.4	9.2	14.8	14.4	3.2	3.4	8.1	5.2	4.3	4.5	2.6	2.0	0.5	1.1	1.0	1.2	5.5	5.9	12.6	12.2	TT
	AA	35.1	37.1	48.7	50.7	15.9	18.5	36.3	25.9	21.9	24.1	13.1	11.3	7.9	9.4	3.8	7.7	20.8	23.9	44.4	45.6	AA
	A	54.0	51.0	35.5	33.6	43.2	43.1	50.5	54.2	61.2	59.9	50.1	47.5	43.3	45.3	37.6	47.7	59.5	57.2	41.6	40.5	A
	BA	2.5	2.6	0.9	1.3	37.7	35.0	5.1	14.7	12.7	11.5	34.2	39.2	48.4	44.2	57.6	43.4	14.2	12.9	1.5	1.6	BA

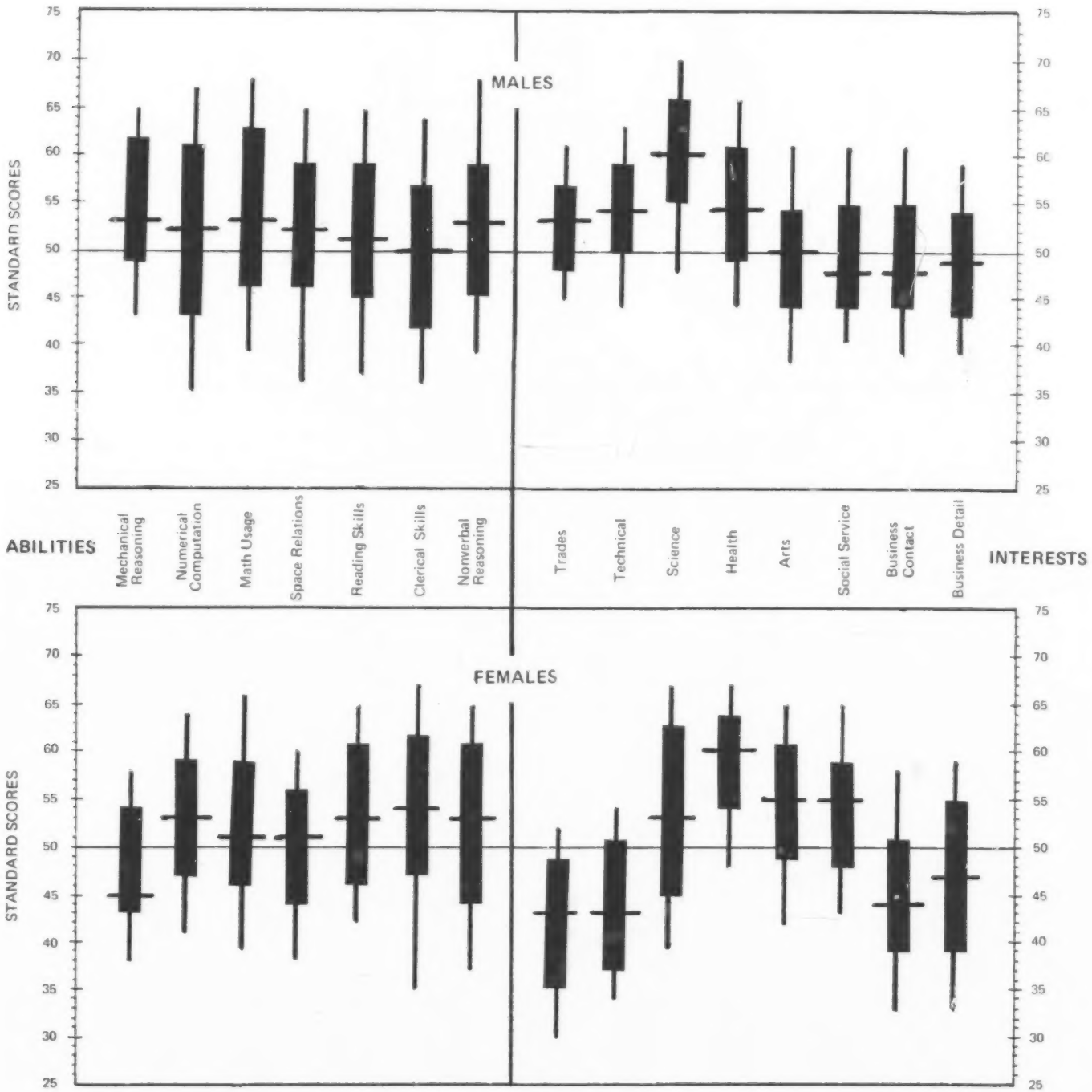
NOTE.–TT = Top Ten Percent, AA = Above Average, A = Average, BA = Below Average.

–Average sample size was 1,017 for males, and 2,157 for females. However, there were slight variations from measure to measure due to missing data.

GENERAL NOTE.–Shaded values represent corresponding percentages for the General Norm group.

NATURAL SCIENCE & HEALTH (Transfer Programs)

FIGURE 1 Profiles for Ability Measures and Vocational Interest Profile Scales



NOTE.–Average sample size for Abilities was 199 for males, and 93 for females. For Interests the average sample size was 191 for males, and 92 for females. However, for both Abilities and Interests there were slight variations from measure to measure due to missing data.

–The profiles for females should be interpreted with caution because of the small sample size.

NATURAL SCIENCE & HEALTH (Transfer Programs)

TABLE 1 Percentage Distribution for H.S. Grades, Career-Related Competencies, and Personal Characteristics

HIGH SCHOOL GRADES

		ENGLISH		MATH		SOCIAL STUDIES		NATURAL SCIENCES		BUSINESS		VOCATIONAL		
MALES	A	8.2	4.0	13.6	6.9	15.2	8.1	18.3	6.3	22.6	12.3	34.6	31.8	A
	B	32.6	25.7	24.6	24.1	45.0	32.8	33.3	28.8	41.7	36.8	47.1	42.8	B
	C	51.0	54.3	42.4	47.9	33.5	47.8	40.6	49.8	27.4	42.0	18.3	22.5	C
	D	7.6	14.8	15.7	18.3	5.8	10.5	6.1	13.8	8.3	7.6	0.0	2.5	D
	F	0.5	1.3	3.7	2.8	0.5	0.8	1.7	1.4	0.0	1.3	0.0	0.4	F
	NT	1.0	2.6	3.5	4.3	3.0	5.9	5.8	10.5	54.4	42.0	43.8	31.6	NT
FEMALES	A	23.3	17.4	18.9	9.3	24.7	17.7	20.4	11.1	25.0	27.4	30.0	38.0	A
	B	48.9	48.4	33.3	31.4	38.2	42.6	40.9	37.8	34.4	43.9	50.0	44.6	B
	C	26.7	31.1	40.0	45.5	36.0	35.3	33.0	43.4	40.6	25.8	20.0	16.6	C
	D	1.1	2.9	5.6	12.7	1.1	4.2	4.6	7.1	0.0	2.6	0.0	0.7	D
	F	0.0	0.2	2.2	1.2	0.0	0.2	1.1	0.6	0.0	0.3	0.0	0.1	F
	NT	1.1	1.6	1.1	4.1	2.2	4.0	3.3	8.3	28.9	18.7	43.8	38.1	NT

NOTE.–NT = Not Taken. Percentages for NT are based on *total group*. Percentages for letter grades are based on those students who took that course. Therefore, A - F = 100%.

–Average sample size was 192 for males, and 90 for females. However, there were slight variations from measure to measure due to missing data.

CAREER-RELATED COMPETENCIES

		TRADES		TECHNICAL		SCIENCE		ARTS		SOC. SERVICE		BUS. CONTACT		BUS. DETAIL		
MALES	MANY	14.0	16.2	20.3	14.2	23.6	9.4	5.8	5.4	6.0	6.0	12.8	14.6	3.2	4.2	MANY
	SOME	49.7	57.9	54.6	56.9	55.0	45.4	31.9	32.8	34.3	34.8	37.4	36.4	32.8	39.1	SOME
	FEW	33.7	24.8	25.1	28.5	18.8	39.2	48.4	45.4	39.2	35.7	48.1	47.4	46.8	45.9	FEW
	NONE	2.6	1.2	0.0	0.4	2.6	6.0	13.8	16.4	20.5	23.5	1.6	1.6	17.2	10.9	NONE
FEMALES	MANY	0.0	1.1	0.0	0.8	14.1	5.1	23.7	17.1	12.9	14.6	5.5	5.3	7.5	13.4	MANY
	SOME	7.7	5.7	25.6	14.7	51.1	36.3	57.0	53.2	56.5	53.4	22.0	25.1	54.8	51.0	SOME
	FEW	63.7	52.2	74.4	77.7	34.8	49.3	19.4	26.5	27.1	24.8	67.0	64.8	34.4	30.9	FEW
	NONE	28.6	41.0	0.0	6.7	0.0	9.2	0.0	3.2	3.5	7.2	5.5	4.8	3.2	4.7	NONE

NOTE.–Average sample size was 185 for males, and 91 for females. However, there were slight variations from measure to measure due to missing data.

CAREER-RELATED PERSONAL CHARACTERISTICS (SELF-ESTIMATES)

		Academic Motivation		Work Motivation		Artistic Ability		Clerical Ability		English Ability		Math Ability		Mechanical Ability		Scientific Ability		Social Self-Confidence		Working with People		
MALES	TT	9.6	5.8	15.6	12.5	3.5	4.1	2.0	2.8	2.5	2.4	6.0	3.9	14.5	12.6	5.0	2.0	4.0	4.5	9.0	11.9	TT
	AA	33.2	29.2	46.2	48.7	20.6	17.7	14.3	15.8	20.0	14.3	28.5	21.0	36.0	43.6	31.7	12.1	26.6	20.2	46.5	42.4	AA
	A	50.8	58.9	34.7	37.2	41.7	37.5	55.1	54.0	53.5	56.6	41.5	50.6	42.0	37.5	48.2	49.1	53.3	55.6	39.5	42.7	A
	BA	6.5	6.1	3.5	1.6	34.2	40.8	28.6	27.3	24.0	26.6	24.0	24.6	7.5	6.2	15.1	36.7	16.1	19.8	5.0	3.1	BA
FEMALES	TT	14.9	9.2	16.1	14.4	4.3	3.4	1.1	5.2	3.2	4.5	9.6	2.0	2.1	1.1	4.3	1.2	4.3	5.9	12.8	12.2	TT
	AA	45.7	37.1	45.2	50.7	24.5	18.5	23.4	25.9	37.2	24.1	18.1	11.3	20.2	9.4	23.4	7.7	27.7	23.9	44.7	45.6	AA
	A	37.2	51.0	38.7	33.6	48.9	43.1	55.3	54.2	48.9	59.9	42.6	47.5	46.8	45.3	46.8	47.7	52.1	57.2	38.3	40.5	A
	BA	2.1	2.6	0.0	1.3	22.3	35.0	20.2	14.7	10.6	11.5	29.8	39.2	30.8	44.2	25.5	43.4	16.0	12.9	4.3	1.6	BA

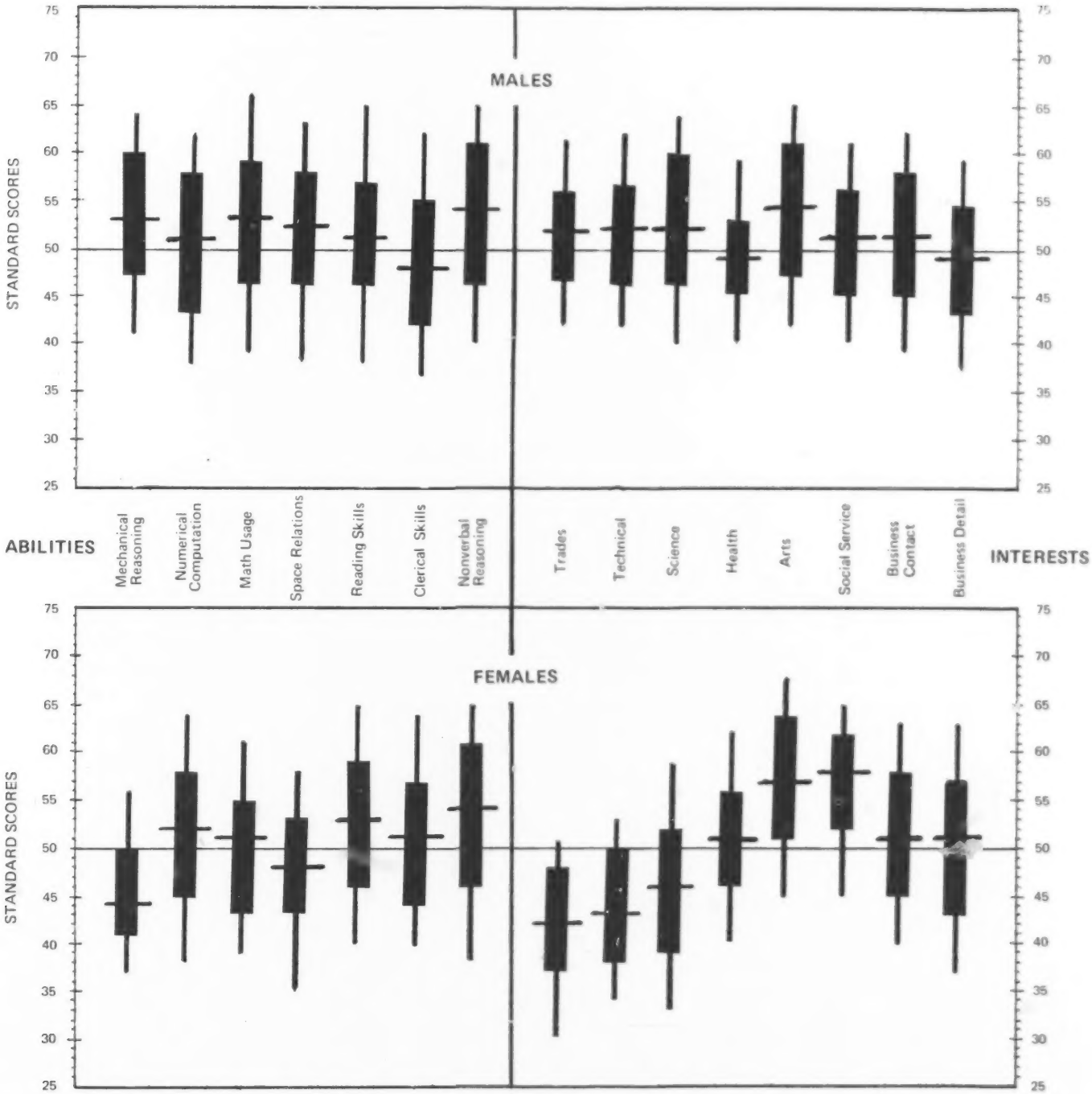
NOTE.–TT = Top Ten Percent, AA = Above Average, A = Average, BA = Below Average.

–Average sample size was 199 for males, and 94 for females. However, there were slight variations from measure to measure due to missing data.

GENERAL NOTE.–Shaded values represent corresponding percentages for the General Norm group.

–The data for females should be interpreted with caution because of the small sample size.

FIGURE 1 Profiles for Ability Measures and Vocational Interest Profile Scales



NOTE.–Average sample size for Abilities was 420 for males, and 317 for females. For Interests the average sample size was 411 for males, and 310 for females. However, for both Abilities and Interests there were slight variations from measure to measure due to missing data.

ARTS & HUMANITIES (Transfer Programs)

TABLE 1 Percentage Distribution for H.S. Grades, Career-Related Competencies, and Personal Characteristics

HIGH SCHOOL GRADES

		ENGLISH		MATH		SOCIAL STUDIES		NATURAL SCIENCES		BUSINESS		VOCATIONAL		
MALES	A	9.6	4.0	3.1	6.9	13.8	8.1	4.8	6.3	12.0	12.3	29.3	31.8	A
	B	31.9	25.7	15.6	24.1	37.8	32.8	26.9	28.8	31.8	36.8	40.5	42.8	B
	C	45.2	54.3	49.0	47.9	37.8	47.8	50.8	49.8	44.2	42.0	24.0	22.5	C
	D	12.3	14.8	27.0	18.3	9.8	10.5	15.9	13.8	10.7	7.6	4.6	2.5	D
	F	1.0	1.3	5.4	2.8	0.8	0.8	1.6	1.4	1.3	1.3	1.6	0.4	F
	NT	2.9	2.6	5.8	4.3	3.9	5.9	8.4	10.5	41.2	42.0	39.0	31.6	NT
FEMALES	A	22.2	17.4	5.3	9.3	22.2	17.7	9.6	11.1	30.1	27.4	33.7	38.0	A
	B	42.1	48.4	21.9	31.4	45.0	42.6	35.3	37.8	37.4	43.9	44.2	44.6	B
	C	31.5	31.1	45.5	45.5	27.4	35.3	43.8	43.4	28.5	25.8	22.1	16.6	C
	D	4.2	2.9	23.3	13.7	5.2	4.2	9.6	7.1	3.2	2.6	0.0	0.7	D
	F	0.0	0.2	4.0	1.2	0.3	0.2	1.7	0.6	0.8	0.3	0.0	0.1	F
	NT	1.3	1.6	4.4	4.1	1.9	4.0	5.5	8.3	18.6	18.7	43.2	38.1	NT

NOTE.–NT = Not Taken. Percentages for NT are based on *total group*. Percentages for letter grades are based on those students who took that course. Therefore, A – F = 100%.

–Average sample size was 408 for males, and 310 for females. However, there were slight variations from measure to measure due to missing data.

CAREER-RELATED COMPETENCIES

		TRADES		TECHNICAL		SCIENCE		ARTS		SOC. SERVICE		BUS. CONTACT		BUS. DETAIL		
MALES	MANY	7.0	16.2	9.3	14.2	11.0	9.4	11.6	5.4	6.8	6.0	12.2	14.6	4.0	4.2	MANY
	SOME	49.2	57.9	51.0	56.9	47.6	45.4	47.6	32.8	40.1	34.8	35.1	36.4	34.2	39.1	SOME
	FEW	39.2	24.8	38.4	28.5	35.9	39.2	32.2	45.4	36.9	35.7	49.8	47.4	47.0	45.9	FEW
	NONE	4.6	1.2	1.3	0.4	5.5	6.0	8.6	16.4	16.3	23.5	3.0	1.6	14.8	10.9	NONE
FEMALES	MANY	0.7	1.1	0.7	0.8	3.8	5.1	22.1	17.1	15.0	14.6	2.3	5.3	9.8	13.4	MANY
	SOME	4.3	5.7	10.2	14.7	31.1	36.3	47.7	53.2	52.0	53.4	27.6	25.1	41.3	51.0	SOME
	FEW	45.0	52.2	78.9	77.7	48.8	49.3	26.3	26.5	28.5	24.8	65.1	64.8	41.0	30.9	FEW
	NONE	50.0	41.0	10.2	6.7	16.4	9.2	3.9	3.2	4.6	7.2	4.9	4.8	7.9	4.7	NONE

NOTE.–Average sample size was 397 for males, and 297 for females. However, there were slight variations from measure to measure due to missing data.

CAREER-RELATED PERSONAL CHARACTERISTICS (SELF-ESTIMATES)

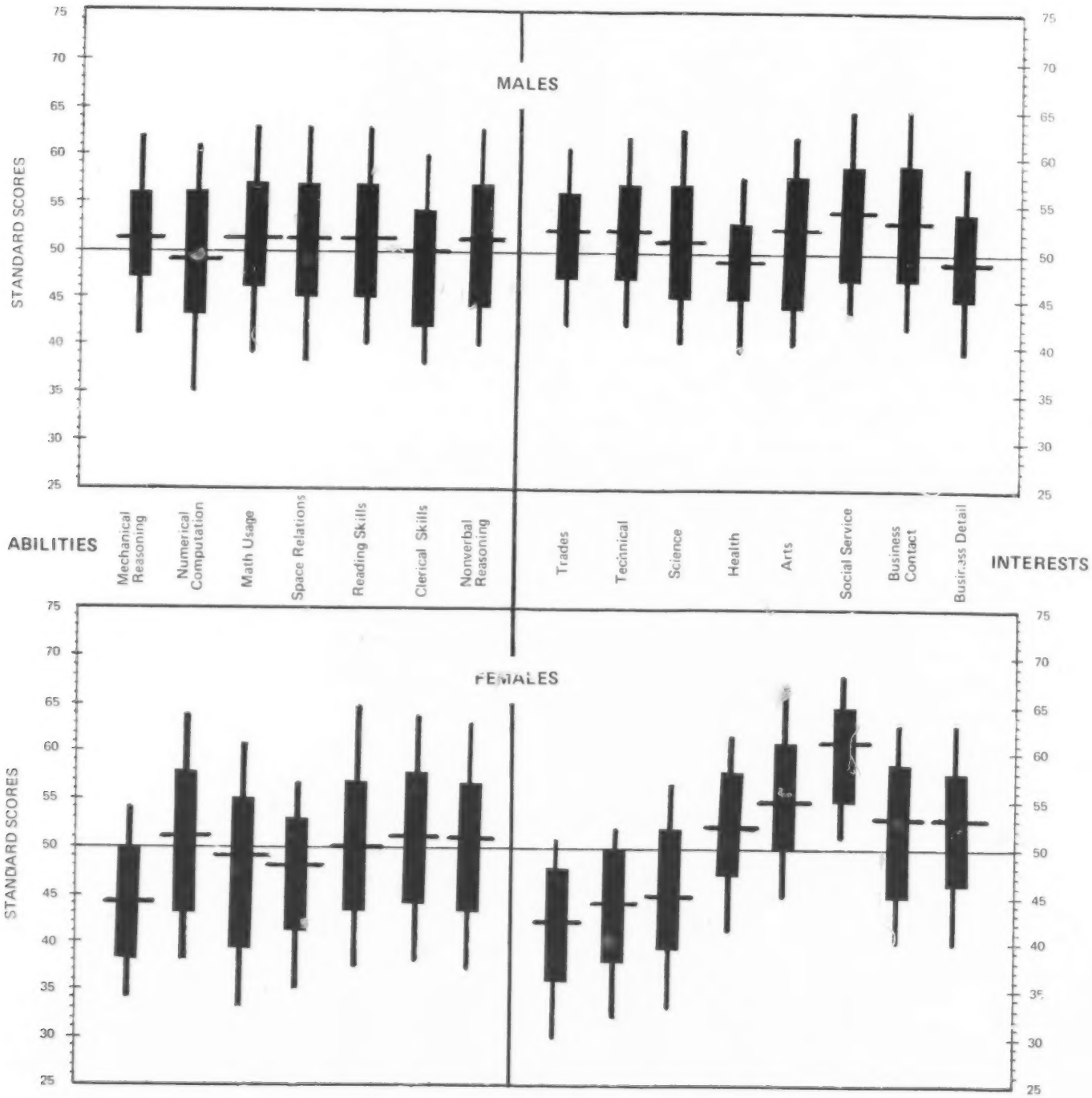
		Academic Motivation		Work Motivation		Artistic Ability		Clerical Ability		English Ability		Math Ability		Mechanical Ability		Scientific Ability		Social Self-Confidence		Working with People		
MALES	TT	3.8	5.8	11.4	12.5	8.8	4.1	2.8	2.8	4.8	2.4	3.1	3.9	7.8	12.6	1.9	2.0	6.6	4.5	14.2	11.9	TT
	AA	34.4	29.2	45.8	48.7	35.7	17.7	14.7	15.8	21.6	14.3	18.8	21.0	33.2	43.6	13.6	12.1	25.1	20.2	43.2	42.4	AA
	A	54.7	58.9	40.4	37.2	33.8	37.5	56.8	54.0	55.3	56.6	40.7	50.6	46.6	37.5	51.9	49.1	53.8	55.6	41.1	42.7	A
	BA	7.1	6.1	2.4	1.6	21.7	40.8	25.6	27.3	18.3	26.6	37.4	24.6	12.4	6.2	32.6	36.7	14.4	19.8	1.4	3.1	BA
FEMALES	TT	9.8	9.2	10.4	14.4	6.0	3.4	4.4	5.2	7.3	4.5	1.0	2.0	1.0	1.1	0.3	1.2	8.2	5.9	13.2	12.2	TT
	AA	38.8	37.1	45.4	50.7	26.7	18.5	13.3	25.9	31.6	24.1	9.5	11.3	7.6	9.4	6.3	7.7	21.4	23.9	46.1	45.6	AA
	A	46.1	51.0	42.6	33.6	35.2	43.1	64.2	54.2	54.3	59.9	45.7	47.5	39.8	45.3	47.6	47.7	59.9	57.2	40.1	40.5	A
	BA	5.4	2.6	1.6	1.3	32.1	35.0	18.0	14.7	6.9	11.5	43.8	39.2	51.7	44.2	45.7	43.4	10.4	12.9	0.6	1.6	BA

NOTE.–TT = Top Ten Percent, AA = Above Average, A = Average, BA = Below Average.

–Average sample size was 421 for males, and 317 for females. However, there were slight variations from measure to measure due to missing data.

GENERAL NOTE.–Shaded values represent corresponding percentages for the General Norm group.

FIGURE 1 Profiles for Ability Measures and Vocational Interest Profile Scales



NOTE.—Average sample size for Abilities was 313 for males, and 397 for females. For Interests the average sample size was 308 for males, and 389 for females. However, for both Abilities and Interests there were slight variations from measure to measure due to missing data.

SOCIAL SCIENCE & PUBLIC SERVICE (Transfer Programs)

TABLE 1 Percentage Distribution for H.S. Grades, Career-Related Competencies, and Personal Characteristics

HIGH SCHOOL GRADES

		ENGLISH		MATH		SOCIAL STUDIES		NATURAL SCIENCES		BUSINESS		VOCATIONAL		
MALES	A	6.2	4.0	6.1	6.9	10.6	8.1	5.4	6.3	14.3	12.3	24.7	31.8	A
	B	25.3	25.7	19.9	24.1	34.6	32.8	25.6	28.8	33.9	36.8	44.2	42.8	B
	C	54.9	54.3	46.5	47.9	45.8	47.8	51.6	49.8	45.0	42.0	28.2	22.5	C
	D	12.8	14.8	23.9	18.3	8.3	10.5	14.8	13.8	5.8	7.6	2.9	2.5	D
	F	0.7	1.3	3.7	2.8	0.7	0.8	2.5	1.4	1.1	1.3	0.0	0.4	F
	NT	1.0	2.6	2.9	4.3	2.3	5.9	8.9	10.5	35.7	42.0	40.6	31.6	NT
FEMALES	A	21.0	17.4	7.9	9.3	20.0	17.7	7.7	11.1	31.2	27.4	35.9	38.0	A
	B	44.9	48.4	27.9	31.4	46.4	42.6	36.2	37.8	37.8	43.9	45.4	44.6	B
	C	33.0	31.1	46.9	45.5	29.6	35.3	43.6	43.4	24.3	25.8	18.2	16.6	C
	D	1.0	2.9	15.4	12.7	3.8	4.2	10.5	7.1	5.9	2.6	0.5	0.7	D
	F	0.0	0.2	1.9	1.2	0.3	0.2	2.0	0.6	0.7	0.3	0.0	0.1	F
	NT	2.3	1.6	5.9	4.1	3.9	4.0	8.8	8.3	20.0	13.7	42.3	38.1	NT

NOTE.–NT = Not Taken. Percentages for NT are based on *total group*. Percentages for letter grades are based on those students who took that course. Therefore, A – F = 100%.

–Average sample size was 302 for males, and 383 for females. However, there were slight variations from measure to measure due to missing data.

CAREER-RELATED COMPETENCIES

		TRADES		TECHNICAL		SCIENCE		ARTS		SOC. SERVICE		BUS. CONTACT		BUS. DETAIL		
MALES	MANY	9.6	16.2	9.6	14.2	6.0	9.4	7.1	5.4	7.9	6.0	19.4	14.6	3.8	4.2	MANY
	SOME	52.3	57.9	53.9	56.9	46.5	45.4	36.3	32.8	46.2	34.8	36.0	36.4	39.7	39.1	SOME
	FEW	35.1	24.8	35.8	28.5	41.2	39.2	44.1	45.4	33.5	35.7	43.2	47.4	45.2	45.9	FEW
	NONE	3.0	1.2	0.7	0.4	6.3	6.0	12.5	16.4	12.4	23.5	1.4	1.6	11.4	10.9	NONE
FEMALES	MANY	1.4	1.1	0.9	0.8	4.9	5.1	13.6	17.1	16.2	14.6	5.4	5.3	11.4	13.4	MANY
	SOME	6.9	5.7	11.9	14.7	32.0	36.3	56.5	53.2	57.0	53.4	23.9	25.1	45.4	51.0	SOME
	FEW	45.4	52.2	79.5	77.7	52.9	49.3	25.4	26.5	21.2	24.8	64.2	64.8	33.4	30.9	FEW
	NONE	46.3	41.0	7.7	6.7	10.1	9.2	4.4	3.2	5.6	7.2	6.4	4.8	9.8	4.7	NONE

NOTE.–Average sample size was 288 for males, and 365 for females. However, there were slight variations from measure to measure due to missing data.

CAREER-RELATED PERSONAL CHARACTERISTICS (SELF-ESTIMATES)

		Academic Motivation		Work Motivation		Artistic Ability		Clerical Ability		English Ability		Math Ability		Mechanical Ability		Scientific Ability		Social Self-Confidence		Working with People		
MALES	TT	6.0	5.8	13.9	12.5	3.2	4.1	2.6	2.8	3.2	2.4	3.5	3.9	7.4	12.6	1.3	2.0	7.7	4.5	15.6	11.9	TT
	AA	27.7	29.2	44.5	48.7	17.9	17.7	12.5	15.8	17.3	14.3	13.7	21.0	34.8	43.6	7.7	12.1	27.2	20.2	43.1	42.4	AA
	A	61.2	58.9	39.0	37.2	37.4	37.5	59.8	54.0	59.6	56.6	43.4	50.6	44.4	37.5	49.7	49.1	51.9	55.6	37.7	42.7	A
	BA	5.1	6.1	2.6	1.6	41.5	40.8	25.1	27.3	19.9	26.6	39.3	24.6	13.4	6.2	41.4	36.7	13.1	19.8	3.5	3.1	BA
FEMALES	TT	8.6	9.2	10.4	14.4	1.0	3.4	4.8	5.2	4.6	4.5	1.8	2.0	0.5	1.1	0.8	1.2	5.8	5.9	12.7	12.2	TT
	AA	41.4	37.1	53.8	50.7	19.9	18.5	22.8	25.9	24.0	24.1	9.1	11.3	5.3	9.4	4.8	7.7	29.7	23.9	50.1	45.6	AA
	A	47.7	51.0	35.5	33.6	48.0	43.1	52.5	54.2	60.0	59.9	46.8	47.5	42.9	45.3	49.2	47.7	54.1	57.2	35.2	40.5	A
	BA	2.3	2.6	0.2	1.3	31.1	35.0	19.8	14.7	11.4	11.5	42.3	39.2	51.3	44.2	45.2	43.4	10.4	12.9	2.0	1.6	BA

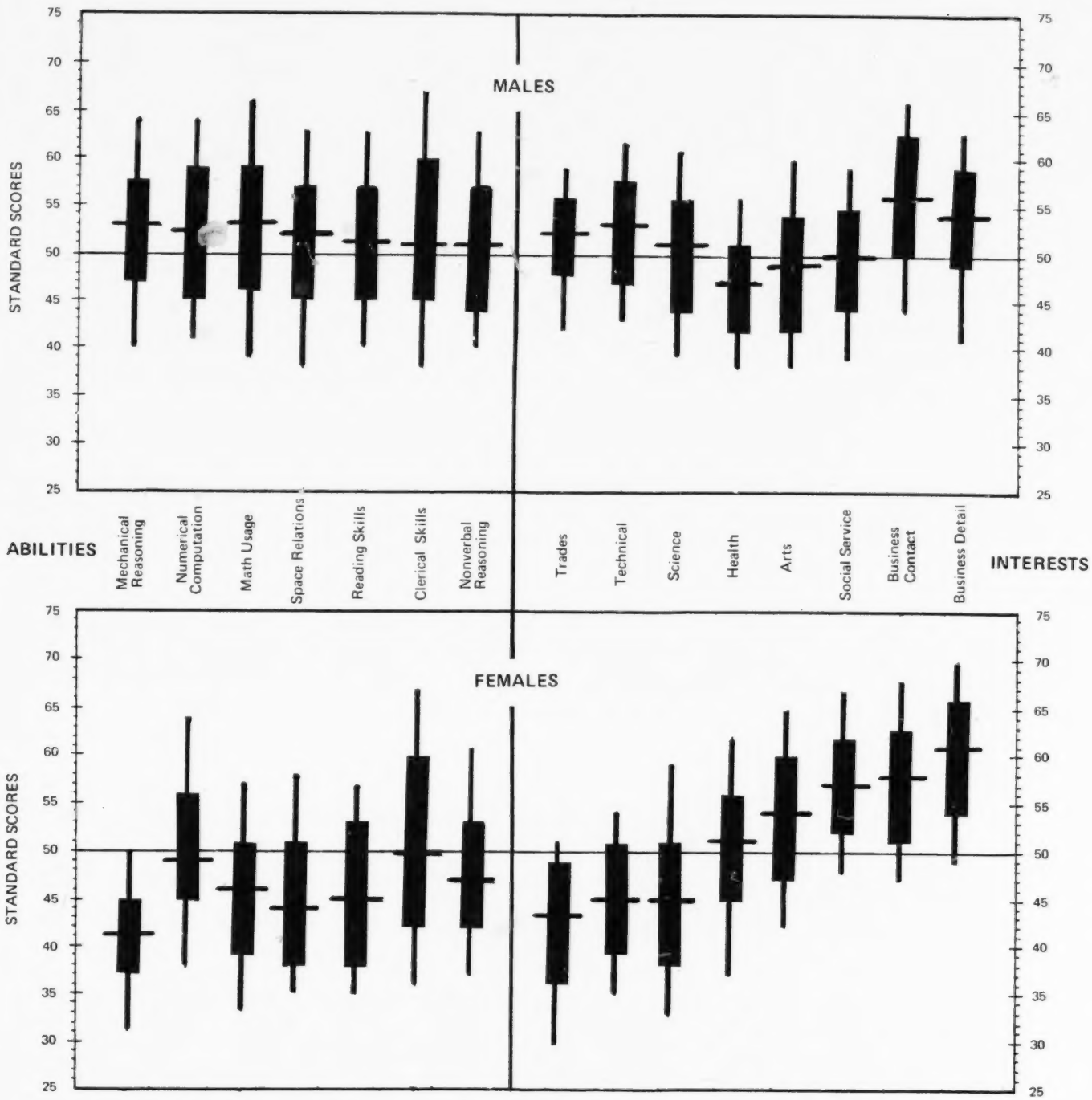
NOTE.–TT = Top Ten Percent, AA = Above Average, A = Average, BA = Below Average.

–Average sample size was 312 for males, and 394 for females. However, there were slight variations from measure to measure due to missing data.

GENERAL NOTE.–Shaded values represent corresponding percentages for the General Norm group.

BUSINESS ADMINISTRATION (Transfer Programs)

FIGURE 1 Profiles for Ability Measures and Vocational Interest Profile Scales



NOTE.–Average sample size for Abilities was 401 for males, and 131 for females. For Interests the average sample size was 397 for males, and 129 for females. However, for both Abilities and Interests there were slight variations from measure to measure due to missing data.

BUSINESS ADMINISTRATION (Transfer Programs)

TABLE 1 Percentage Distribution for H.S. Grades, Career-Related Competencies, and Personal Characteristics

HIGH SCHOOL GRADES

		ENGLISH		MATH		SOCIAL STUDIES		NATURAL SCIENCES		BUSINESS		VOCATIONAL		
MALES	A	5.8	4.0	6.4	6.9	10.6	8.1	5.6	6.3	22.6	12.3	18.0	31.8	A
	B	29.2	25.7	19.8	24.1	36.6	32.8	22.4	28.8	41.7	36.8	48.4	42.8	B
	C	55.7	54.3	54.1	47.9	46.4	47.8	58.4	49.8	32.3	42.0	32.3	22.5	C
	D	9.1	14.8	17.0	18.3	5.7	10.5	13.1	13.8	3.5	7.6	0.9	2.5	D
	F	0.2	1.3	2.6	2.8	0.8	0.8	0.5	1.4	0.0	1.3	0.5	0.4	F
	NT	1.0	2.6	2.8	4.3	2.8	5.9	4.8	10.5	25.2	42.0	43.8	31.6	NT
FEMALES	A	11.7	17.4	5.7	9.3	18.8	17.7	10.5	11.1	28.1	27.4	30.9	38.0	A
	B	52.3	48.4	39.3	31.4	36.1	42.6	30.7	37.8	53.5	43.9	51.8	44.6	B
	C	35.2	31.1	46.7	45.5	41.0	35.3	51.8	43.4	17.5	25.8	16.0	16.6	C
	D	0.8	2.9	8.2	12.7	4.1	4.2	7.0	7.1	0.9	2.6	1.2	0.7	D
	F	0.0	0.2	0.0	1.2	0.0	0.2	0.0	0.6	0.0	0.3	0.0	0.1	F
	NT	0.0	1.6	4.7	4.1	3.9	4.0	8.1	8.3	8.8	18.7	32.5	38.1	NT

NOTE.–NT = Not Taken. Percentages for NT are based on *total group*. Percentages for letter grades are based on those students who took that course. Therefore, A - F = 100%.

–Average sample size was 394 for males, and 125 for females. However, there were slight variations from measure to measure due to missing data.

CAREER-RELATED COMPETENCIES

		TRADES		TECHNICAL		SCIENCE		ARTS		SOC. SERVICE		BUS. CONTACT		BUS. DETAIL		
MALES	MANY	6.9	16.2	5.7	14.2	6.6	9.4	7.0	5.4	8.8	6.0	21.9	14.6	8.8	4.2	MANY
	SOME	47.8	57.9	47.1	56.9	40.2	45.4	35.7	32.8	39.7	34.8	33.8	36.4	49.0	39.1	SOME
	FEW	41.6	24.8	46.0	28.5	45.7	39.2	44.8	45.4	33.7	35.7	43.8	47.4	35.8	45.9	FEW
	NONE	3.6	1.2	1.1	0.4	7.4	6.0	12.6	16.4	17.8	23.5	0.5	1.6	6.5	10.9	NONE
FEMALES	MANY	0.0	1.1	0.0	0.8	2.5	5.1	13.6	17.1	9.0	14.6	8.9	5.3	16.7	13.4	MANY
	SOME	6.2	5.7	9.2	14.7	24.6	36.3	52.8	53.2	58.6	53.4	21.0	25.1	61.1	51.0	SOME
	FEW	42.9	52.2	84.4	77.7	60.7	49.3	28.0	26.5	27.9	24.8	66.1	64.8	19.8	30.9	FEW
	NONE	50.9	41.0	6.4	6.7	12.3	9.2	5.6	3.2	4.5	7.2	4.0	4.8	2.4	4.7	NONE

NOTE.–Average sample size was 375 for males, and 118 for females. However, there were slight variations from measure to measure due to missing data.

CAREER-RELATED PERSONAL CHARACTERISTICS (SELF-ESTIMATES)

		Academic Motivation		Work Motivation		Artistic Ability		Clerical Ability		English Ability		Math Ability		Mechanical Ability		Scientific Ability		Social Self-Confidence		Working with People		
MALES	TT	5.2	5.8	13.9	12.5	2.5	4.1	4.7	2.8	2.2	2.4	2.7	3.9	6.7	12.6	1.5	2.0	5.9	4.5	15.5	11.9	TT
	AA	33.7	29.2	52.0	48.7	14.6	17.7	26.3	15.8	17.1	14.3	19.1	21.0	32.4	43.6	7.4	12.1	24.0	20.2	44.2	42.4	AA
	A	56.1	58.9	32.7	37.2	38.6	37.5	51.9	54.0	57.6	56.6	53.7	50.6	48.8	37.5	51.1	49.1	54.5	55.6	39.5	42.7	A
	BA	5.0	6.1	1.5	1.6	44.3	40.8	17.1	27.3	23.1	26.6	24.5	24.6	12.1	6.2	40.0	36.7	15.6	19.8	0.8	3.1	BA
FEMALES	TT	7.6	9.2	17.2	14.4	4.7	3.4	12.2	5.2	1.5	4.5	1.5	2.0	1.5	1.1	0.0	1.2	6.1	5.9	17.6	12.2	TT
	AA	33.6	37.1	49.2	50.7	12.5	18.5	37.4	25.9	19.1	24.1	13.0	11.3	7.7	9.4	4.6	7.7	33.6	23.9	55.7	45.6	AA
	A	56.5	51.0	32.8	33.6	39.8	43.1	44.3	54.2	67.9	59.9	52.7	47.5	33.8	45.3	41.2	47.7	52.7	57.2	26.0	40.5	A
	BA	2.3	2.6	0.8	1.3	43.0	35.0	6.1	14.7	11.4	11.5	32.8	39.2	56.9	44.2	54.2	43.4	7.6	12.9	0.8	1.6	BA

NOTE.–TT = Top Ten Percent, AA = Above Average, A = Average, BA = Below Average.

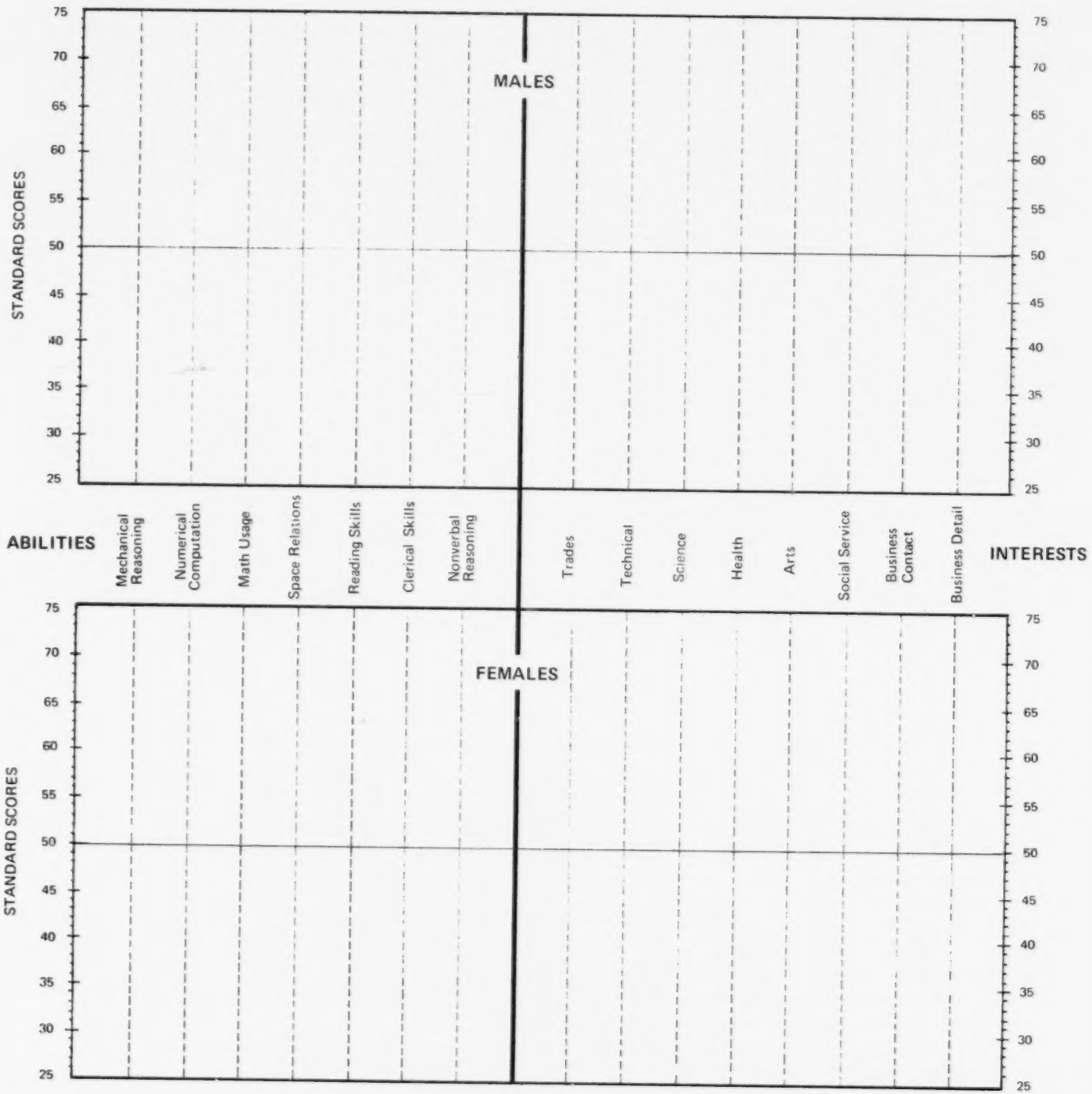
–Average sample size was 403 for males, and 130 for females. However, there were slight variations from measure to measure due to missing data.

GENERAL NOTE.–Shaded values represent corresponding percentages for the General Norm group.

Name of Student

Date CPP was taken

STUDENT PROFILE SHEET



THIS FORM MAY BE REPRODUCED FOR COUNSELING USE

APPENDIX C

SPECIAL SUBGROUP NORMS

- Age 25 and Older
- Part-time Students
- Afro-American/Black
- Mexican-Spanish/American

Tabular Norms

The following tables are provided for males, females, and total group for each of the above special subgroups, except for Mexican-Spanish/American for which only male and total group norms are reported. Sample size was not sufficient to supply norms for females in this case.

Table 1. Distribution of Ability Measures (in percentiles)

Table 2. Distribution of Vocational Interest Profile Scales (in percentiles)

Table 3. Percentage Distribution for H.S. Grades, Career-Related Competencies, and Personal Characteristics

Caution

The special subgroup norms should be used with caution. Because students in the various subgroups have had diverse educational experiences, the implications of the normative information for counseling, guidance, and placement can vary from group to group. For example, the self-report information related to high school grades for adult students may not be as accurate or useful because of the time interval between high school and entry into a postsecondary educational institution. Likewise, subgroups of students from culturally different backgrounds may not have had the life experiences and educational opportunities which result in high test scores. The Special Subgroup Norms can be used to obtain an indication of how an individual compares with others from similar circumstances. Comparison of an individual's scores with local norms based on students with whom he will compete should also prove useful—both to the student in making educational plans and to the institution in helping him implement them.

AGE 25 AND OLDER

TABLE 1 Distribution of Ability Measures (in percentiles)

Standard Score	Mechanical Reasoning			Numerical Computation			Math Usage			Space Relations			Standard Score
	M	F	T	M	F	T	M	F	T	M	F	T	
76-80	99	99	99	99	99	99	99	99	99	99	99	99	76-80
71-75	98	99	99	98	99	99	99	99	99	97	99	98	71-75
66-70	92	99	95	97	98	97	96	99	97	93	99	96	66-70
61-65	81	99	89	92	96	93	90	97	93	87	97	91	61-65
58-60	68	96	80	85	92	88	83	94	88	79	94	85	58-60
55-57	58	93	73	79	86	82	74	88	80	69	89	77	55-57
52-54	47	87	64	70	79	74	63	80	70	58	81	68	52-54
49-51	32	75	50	58	68	62	48	67	56	48	72	58	49-51
46-48	22	64	39	48	57	52	33	52	41	37	59	46	46-48
43-45	15	51	30	37	43	39	24	39	30	28	45	35	43-45
40-42	9	36	20	24	28	26	19	32	25	21	34	27	40-42
35-39	5	23	13	13	16	14	14	25	19	14	23	18	35-39
30-34	2	11	6	5	6	6	7	13	10	8	13	10	30-34
25-29	1	4	2	2	3	2	2	4	3	4	7	5	25-29
20-24	1	1	1	1	1	1	0	0	0	1	3	2	20-24
	M	F	T	M	F	T	M	F	T	M	F	T	
Mean	54.1	43.6	49.7	47.9	45.8	47.0	49.6	44.9	47.6	50.1	44.1	47.6	Mean
S.D.	9.8	8.9	10.8	10.2	9.2	9.8	10.2	9.7	10.3	11.9	10.3	11.6	S.D.

Standard Score	Reading Skills			Language Usage			Clerical Skills			Nonverbal Reasoning			Standard Score
	M	F	T	M	F	T	M	F	T	M	F	T	
76-80	99	99	99				99	99	99	99	99	99	76-80
71-75	98	99	98				97	99	98	99	99	99	71-75
66-70	95	96	95				92	95	94	97	98	98	66-70
61-65	88	88	88				86	91	88	93	94	94	61-65
58-60	81	80	81				80	85	82	89	90	89	58-60
55-57	74	74	74				74	79	76	85	85	85	55-57
52-54	64	64	64				67	71	68	77	77	77	52-54
49-51	52	52	52	NOT YET			57	61	59	68	69	68	49-51
46-48	39	39	39	AVAILABLE			46	51	48	57	60	58	46-48
43-45	30	31	30				36	40	38	44	49	46	43-45
40-42	20	21	21				24	28	25	31	38	34	40-42
35-39	11	12	11				12	16	14	18	24	21	35-39
30-34	4	5	5				5	7	6	8	12	9	30-34
25-29	2	2	2				2	4	3	2	4	3	25-29
20-24	1	1	1				1	1	1	1	1	1	20-24
	M	F	T	M	F	T	M	F	T	M	F	T	
Mean	49.8	49.6	49.7				49.4	47.7	48.7	46.0	44.9	45.5	Mean
S.D.	10.6	10.7	10.6				11.3	11.0	11.2	10.2	10.7	10.4	S.D.

NOTE.—Average sample size was 1,516 for males, and 1,091 for females. However, there were slight variations from measure to measure due to missing data.

AGE 25 AND OLDER

TABLE 2 Distribution of Vocational Interest Profile Scales (in percentiles)

Standard Score	Trades			Technical			Science			Health			Standard Score
	M	F	T	M	F	T	M	F	T	M	F	T	
76-80	99	99	99	99	99	99	99	99	99	99	99	99	76-80
71-75	98	99	99	98	99	99	98	99	98	99	95	97	71-75
66-70	93	99	96	94	99	97	92	98	94	98	85	93	66-70
61-65	81	99	89	83	99	90	82	93	87	96	62	81	61-65
58-60	66	99	80	69	98	81	71	87	78	91	40	69	58-60
55-57	51	97	70	57	96	73	59	77	66	86	31	63	55-57
52-54	34	94	59	42	90	62	45	63	53	79	24	56	52-54
49-51	21	85	48	30	79	50	35	51	42	66	17	45	49-51
46-48	12	72	37	19	66	39	25	39	31	51	12	35	46-48
43-45	7	59	29	12	53	29	16	26	20	40	8	27	43-45
40-42	4	46	21	7	40	20	10	17	13	29	6	19	40-42
35-39	2	30	14	3	25	12	6	10	7	15	3	10	35-39
30-34	1	14	6	1	10	5	2	3	2	6	1	4	30-34
25-29	1	6	3	1	4	2	1	1	1	2	1	1	25-29
20-24	1	3	1	1	2	1	1	1	1	1	1	1	20-24
	M	F	T	M	F	T	M	F	T	M	F	T	
Mean	55.7	41.3	49.6	54.4	43.0	49.6	53.6	49.5	51.9	46.4	59.1	51.7	Mean
S.D.	8.0	8.6	10.9	8.7	8.5	10.2	9.9	8.9	9.7	9.2	9.5	11.2	S.D.

Standard Score	Arts			Social Service			Business Contact			Business Detail			Standard Score
	M	F	T	M	F	T	M	F	T	M	F	T	
76-80	99	99	99	99	99	99	99	99	99	99	99	99	76-80
71-75	99	98	99	99	98	99	99	99	99	99	99	99	71-75
66-70	99	94	97	98	94	96	96	97	96	97	94	96	66-70
61-65	95	83	90	95	79	88	89	91	90	92	84	89	61-65
58-60	89	69	81	89	62	78	81	83	82	85	74	80	58-60
55-57	83	57	72	82	48	68	73	74	74	77	64	72	55-57
52-54	72	43	60	73	36	57	66	67	66	66	55	61	52-54
49-51	59	29	47	62	25	47	57	57	57	51	43	48	49-51
46-48	48	20	36	51	16	37	46	46	46	38	32	35	46-48
43-45	37	14	27	37	10	25	36	35	36	28	23	26	43-45
40-42	26	9	19	25	5	16	24	23	23	19	16	17	40-42
35-39	15	5	11	15	2	10	12	12	12	11	9	10	35-39
30-34	7	2	5	6	1	4	5	5	5	5	4	4	30-34
25-29	2	1	2	2	1	1	2	2	2	2	1	1	25-29
20-24	1	1	1	1	1	1	1	1	1	1	1	1	20-24
	M	F	T	M	F	T	M	F	T	M	F	T	
Mean	47.2	54.1	50.1	47.2	55.7	50.8	48.8	48.7	48.8	49.2	51.7	50.2	Mean
S.D.	9.6	9.4	10.1	9.4	8.4	9.9	10.4	9.9	10.2	9.6	10.3	10.0	S.D.

NOTE.–Average sample size was 1,477 for males, and 1,070 for females. However, there were slight variations from measure to measure due to missing data.

AGE 25 AND OLDER

TABLE 3 Percentage Distribution for H.S. Grades, Career-Related Competencies, and Personal Characteristics

HIGH SCHOOL GRADES

		ENGLISH	MATH	SOCIAL STUDIES	NATURAL SCIENCES	BUSINESS	VOCATIONAL	
MALES	A	3.2	8.7	6.0	5.5	8.7	21.5	A
	B	22.0	27.6	30.9	27.8	34.8	44.2	B
	C	56.7	47.4	53.5	53.5	47.1	30.9	C
	D	16.6	14.3	8.6	12.1	7.5	2.9	D
	F	1.5	2.0	0.9	1.0	1.9	0.4	F
	NT	7.8	8.8	12.5	19.6	49.2	35.4	NT
FEMALES	A	17.1	10.5	13.7	9.8	20.1	28.9	A
	B	47.0	34.6	42.1	39.2	41.9	45.8	B
	C	33.4	43.9	39.6	46.5	34.9	24.1	C
	D	2.2	9.7	4.4	4.1	2.7	0.8	D
	F	0.3	1.2	0.2	0.3	0.4	0.3	F
	NT	5.9	7.5	8.7	16.8	30.0	40.0	NT
		ENGLISH	MATH	SOCIAL STUDIES	NATURAL SCIENCES	BUSINESS	VOCATIONAL	
TOTAL	A	9.2	9.5	9.4	7.4	14.4	24.5	A
	B	32.7	30.6	35.7	32.7	38.4	44.9	B
	C	46.8	45.9	47.5	50.5	40.9	28.2	C
	D	10.4	12.4	6.8	8.7	5.1	2.1	D
	F	1.0	1.7	0.6	0.7	1.2	0.4	F
	NT	7.0	8.2	10.9	18.5	41.0	37.3	NT

NOTE.–NT = Not Taken. Percentages for NT are based on *total group*. Percentages for letter grades are based on those students who took that course. Therefore, A–F = 100%.

–Average sample size was 1,451 for males, and 1,061 for females. However, there were slight variations from measure to measure due to missing data.

CAREER-RELATED COMPETENCIES

		TRADES	TECHNICAL	SCIENCE	ARTS	SOC. SERVICE	BUS. CONTACT	BUS. DETAIL	
MALES	MANY	24.2	18.0	7.2	5.7	10.4	20.2	9.2	MANY
	SOME	60.0	58.2	44.8	29.8	40.2	35.6	51.1	SOME
	FEW	14.9	23.5	40.7	43.7	34.3	42.9	33.6	FEW
	NONE	0.8	0.3	7.3	20.8	15.2	1.2	6.1	NONE
FEMALES	MANY	1.2	0.8	4.1	18.5	29.0	7.1	21.1	MANY
	SOME	9.8	17.3	37.5	50.0	52.5	28.8	48.9	SOME
	FEW	58.4	78.3	53.6	27.4	15.1	61.3	26.0	FEW
	NONE	30.5	3.6	4.8	4.0	3.4	2.7	4.0	NONE
		TRADES	TECHNICAL	SCIENCE	ARTS	SOC. SERVICE	BUS. CONTACT	BUS. DETAIL	
TOTAL	MANY	15.1	11.2	5.9	11.2	18.3	14.6	14.3	MANY
	SOME	40.1	41.9	41.7	38.5	45.4	32.7	50.2	SOME
	FEW	32.2	45.3	46.1	36.7	26.1	50.8	30.4	FEW
	NONE	12.6	1.6	6.3	13.6	10.1	1.9	5.2	NONE

NOTE.–Average sample size was 1,358 for males, and 977 for females. However, there were slight variations from measure to measure due to missing data.

[Continued]

AGE 25 AND OLDER

TABLE 3 *[Continued]* Percentage Distribution for H.S. Grades, Career-Related Competencies, and Personal Characteristics

CAREER-RELATED PERSONAL CHARACTERISTICS (SELF-ESTIMATES)

		Academic Motivation	Work Motivation	Artistic Ability	Clerical Ability	English Ability	Math Ability	Mechanical Ability	Scientific Ability	Social Self-Confidence	Working with People	
MALES	TT	10.6	16.6	2.9	4.0	3.6	3.9	13.7	2.4	6.2	13.1	TT
	AA	38.1	51.7	12.3	19.0	12.5	18.1	41.4	10.0	22.4	41.6	AA
	A	47.2	29.9	33.2	52.9	54.6	54.0	39.0	46.1	53.7	40.9	A
	BA	4.2	1.8	51.7	24.1	29.4	24.1	6.0	41.4	17.7	4.4	BA
FEMALES	TT	14.5	17.8	1.8	5.0	4.8	1.5	1.7	1.3	7.0	11.4	TT
	AA	44.6	53.4	15.4	17.7	23.0	7.8	10.5	6.1	26.3	41.4	AA
	A	38.5	27.0	40.5	57.7	60.1	48.3	47.8	49.9	56.6	44.9	A
	BA	2.4	1.9	42.4	19.6	12.1	42.4	40.1	42.7	10.1	2.3	BA
TOTAL	TT	12.2	17.1	2.4	4.4	4.1	2.9	8.7	2.0	6.5	12.4	TT
	AA	40.8	52.4	13.6	18.5	16.8	13.8	28.5	8.4	24.0	41.5	AA
	A	43.6	28.7	36.2	54.9	56.9	51.6	42.7	47.7	54.9	42.6	A
	BA	3.4	1.8	47.8	22.2	22.2	31.7	20.2	42.0	14.5	3.5	BA

NOTE.–TT = Top Ten Percent, AA = Above Average, A = Average, BA = Below Average.

–Average sample size was 1,511 for males, and 1,082 for females. However, there were slight variations from measure to measure due to missing data.

PART-TIME STUDENTS

TABLE 1 Distribution of Ability Measures (in percentiles)

Standard Score	Mechanical Reasoning			Numerical Computation			Math Usage			Space Relations			Standard Score
	M	F	T	M	F	T	M	F	T	M	F	T	
76-80	99	99	99	99	99	99	99	99	99	99	99	99	76-80
71-75	99	99	99	99	97	98	99	99	99	97	99	98	71-75
66-70	94	99	96	97	96	96	97	98	97	92	99	95	66-70
61-65	87	99	91	91	92	91	90	94	92	86	97	90	61-65
58-60	76	96	84	83	84	84	83	91	86	76	94	83	58-60
55-57	66	91	76	76	77	76	74	83	77	66	87	74	55-57
52-54	55	87	68	67	69	68	64	74	67	56	78	64	52-54
49-51	38	75	52	55	57	56	49	60	53	44	66	53	49-51
46-48	25	64	40	44	46	45	35	43	38	33	52	40	46-48
43-45	18	50	31	32	32	32	24	33	27	24	38	29	43-45
40-42	10	33	19	20	19	20	18	28	22	17	28	21	40-42
35-39	5	19	10	13	10	12	14	22	17	11	17	13	35-39
30-34	2	7	4	6	3	5	6	10	8	5	6	6	30-34
25-29	1	2	1	2	1	2	2	3	2	2	3	3	25-29
20-24	1	1	1	1	1	1	0	0	0	1	1	1	20-24
	M	F	T	M	F	T	M	F	T	M	F	T	
Mean	52.6	44.2	49.3	48.5	48.8	48.6	49.6	46.9	48.5	51.3	46.0	49.2	Mean
S.D.	9.3	8.1	9.8	10.0	9.9	10.0	9.8	10.1	10.0	11.3	9.1	10.8	S.D.

Standard Score	Reading Skills			Language Usage			Clerical Skills			Nonverbal Reasoning			Standard Score
	M	F	T	M	F	T	M	F	T	M	F	T	
76-80	99	99	99				99	99	99	99	99	99	76-80
71-75	99	99	99				97	98	98	99	98	99	71-75
66-70	96	96	96				91	94	92	97	96	97	66-70
61-65	91	88	90				85	88	86	92	90	91	61-65
58-60	85	80	83				78	80	79	85	82	84	58-60
55-57	78	72	76				71	71	71	79	76	78	55-57
52-54	68	62	66				62	62	62	68	65	67	52-54
49-51	56	50	53	NOT YET AVAILABLE			53	51	52	55	54	55	49-51
46-48	42	38	41				42	39	41	44	45	44	46-48
43-45	32	29	31				31	29	31	32	33	32	43-45
40-42	21	19	20				21	20	21	21	22	22	40-42
35-39	10	10	10				12	11	11	12	13	12	35-39
30-34	4	3	4				5	5	5	5	6	5	30-34
25-29	1	1	1				2	3	2	2	3	2	25-29
20-24	1	0	1				1	1	1	1	1	1	20-24
	M	F	T	M	F	T	M	F	T	M	F	T	
Mean	49.1	50.2	49.5				50.3	50.2	50.3	48.6	48.8	48.7	Mean
S.D.	9.9	9.9	9.9				11.3	10.7	11.1	9.9	10.7	10.2	S.D.

NOTE.–Average sample size was 796 for males, and 512 for females. However, there were slight variations from measure to measure due to missing data.

PART-TIME STUDENTS

TABLE 2 Distribution of Vocational Interest Profile Scales (in percentiles)

Standard Score	Trades			Technical			Science			Health			Standard Score
	M	F	T	M	F	T	M	F	T	M	F	T	
76-80	99	99	99	99	99	99	99	99	99	99	99	99	76-80
71-75	98	99	99	98	99	99	97	99	98	99	97	99	71-75
66-70	93	99	96	94	99	96	93	98	95	99	90	95	66-70
61-65	81	99	89	82	99	89	85	94	89	96	75	87	61-65
58-60	66	99	79	69	97	80	76	89	82	91	58	78	58-60
55-57	52	98	70	58	95	72	66	82	73	87	48	72	55-57
52-54	36	96	59	43	89	61	54	72	61	81	39	64	52-54
49-51	22	87	48	31	80	50	43	63	51	68	29	52	49-51
46-48	12	73	37	21	67	39	32	52	40	52	21	40	46-48
43-45	7	60	28	13	53	29	20	38	27	41	14	31	43-45
40-42	3	46	20	7	38	19	12	27	18	29	9	21	40-42
35-39	1	28	12	3	22	10	6	16	10	15	4	11	35-39
30-34	1	12	5	1	8	4	2	6	4	5	1	4	30-34
25-29	0	5	2	1	3	1	1	2	1	2	1	1	25-29
20-24	0	2	1	1	1	1	1	1	1	1	1	1	20-24
	M	F	T	M	F	T	M	F	T	M	F	T	
Mean	55.8	41.3	50.0	54.3	43.4	50.0	52.2	46.9	50.1	46.2	55.5	49.9	Mean
S.D.	7.7	8.0	10.5	8.8	8.1	10.1	9.9	9.6	10.1	8.9	10.0	10.4	S.D.

Standard Score	Arts			Social Service			Business Contact			Business Detail			Standard Score
	M	F	T	M	F	T	M	F	T	M	F	T	
76-80	99	99	99	99	99	99	99	99	99	99	99	99	76-80
71-75	99	98	99	99	99	99	99	99	99	99	98	99	71-75
66-70	99	94	97	99	93	96	97	96	96	97	93	96	66-70
61-65	95	84	90	97	79	89	91	89	90	93	81	88	61-65
58-60	90	71	82	92	62	80	83	79	82	88	70	81	58-60
55-57	84	60	74	87	47	71	75	69	73	81	61	73	55-57
52-54	73	46	62	79	35	61	68	61	65	71	49	62	52-54
49-51	59	31	48	68	25	51	58	52	56	56	37	48	49-51
46-48	46	20	36	55	17	40	46	41	44	41	26	35	46-48
43-45	36	13	27	40	10	28	35	31	33	30	20	26	43-45
40-42	25	8	18	29	6	20	23	19	22	21	14	18	40-42
35-39	13	4	10	17	3	12	13	9	11	13	8	11	35-39
30-34	5	2	4	7	1	4	5	4	5	7	4	6	30-34
25-29	1	1	1	2	1	1	2	1	2	2	1	2	25-29
20-24	1	1	1	1	1	1	1	1	1	1	1	1	20-24
	M	F	T	M	F	T	M	F	T	M	F	T	
Mean	47.3	53.8	49.9	46.0	55.7	49.9	48.6	50.1	49.2	48.1	52.9	50.0	Mean
S.D.	9.1	9.1	9.6	9.0	8.7	10.0	10.1	9.9	10.0	9.8	10.6	10.4	S.D.

NOTE.–Average sample size was 777 for males, and 512 for females. However, there were slight variations from measure to measure due to missing data.

PART-TIME STUDENTS

TABLE 3 Percentage Distribution for H.S. Grades, Career-Related Competencies, and Personal Characteristics

HIGH SCHOOL GRADES

		ENGLISH	MATH	SOCIAL STUDIES	NATURAL SCIENCES	BUSINESS	VOCATIONAL	
MALES	A	3.0	6.3	6.6	6.4	12.8	29.0	A
	B	29.2	27.0	32.7	27.6	35.0	41.3	B
	C	51.2	48.4	49.4	49.6	41.8	26.0	C
	D	14.6	16.6	9.9	14.8	8.5	3.2	D
	F	2.0	1.8	1.4	1.5	1.9	0.0	F
	NT	4.8	7.1	9.8	14.7	51.8	35.7	NT
FEMALES	A	16.1	11.3	19.4	11.5	27.6	37.3	A
	B	49.2	30.7	39.2	38.0	40.1	41.9	B
	C	30.7	42.9	36.3	44.1	29.1	20.1	C
	D	3.4	13.0	4.8	5.9	3.2	0.7	D
	F	0.6	2.1	0.2	0.4	0.0	0.0	F
	NT	3.5	5.6	6.3	12.1	19.5	43.8	NT
TOTAL	A	8.2	8.3	11.8	8.5	20.6	32.0	A
	B	37.1	28.5	35.3	31.7	37.7	41.9	B
	C	43.0	46.2	44.2	47.4	35.1	23.8	C
	D	10.1	15.2	7.8	11.3	5.7	2.3	D
	F	1.4	1.9	0.9	1.1	0.9	0.0	F
	NT	4.3	6.5	8.4	13.7	38.8	38.8	NT

NOTE.–NT = Not Taken. Percentages for NT are based on *total group*. Percentages for letter grades are based on those students who took that course. Therefore, A–F = 100%.

–Average sample size was 780 for males, and 508 for females. However, there were slight variations from measure to measure due to missing data.

CAREER-RELATED COMPETENCIES

		TRADES	TECHNICAL	SCIENCE	ARTS	SOC. SERVICE	BUS. CONTACT	BUS. DETAIL	
MALES	MANY	20.4	17.1	9.1	6.4	7.7	16.8	6.0	MANY
	SOME	56.4	55.4	43.3	33.7	37.1	33.9	39.0	SOME
	FEW	22.3	26.6	38.7	43.5	32.6	47.2	44.1	FEW
	NONE	0.9	1.0	8.9	16.4	22.7	2.0	10.9	NONE
FEMALES	MANY	0.6	0.9	4.6	17.2	20.9	5.8	19.7	MANY
	SOME	6.0	15.4	34.4	50.7	46.9	25.7	49.7	SOME
	FEW	53.4	76.6	52.1	28.3	24.7	64.7	26.4	FEW
	NONE	40.0	7.1	8.8	3.8	7.5	3.8	4.1	NONE
TOTAL	MANY	13.0	11.0	7.3	10.7	12.9	12.5	11.4	MANY
	SOME	37.6	40.4	39.8	40.4	40.9	30.7	43.3	SOME
	FEW	33.9	45.3	44.0	37.5	29.5	54.1	37.1	FEW
	NONE	15.4	3.3	8.9	11.5	16.7	2.7	8.2	NONE

NOTE.–Average sample size was 756 for males, and 479 for females. However, there were slight variations from measure to measure due to missing data.

[Continued]

TABLE 3 *[Continued]* Percentage Distribution for H.S. Grades, Career-Related Competencies, and Personal Characteristics

CAREER-RELATED PERSONAL CHARACTERISTICS (SELF-ESTIMATES)

		Academic Motivation	Work Motivation	Artistic Ability	Clerical Ability	English Ability	Math Ability	Mechanical Ability	Scientific Ability	Social Self-Confidence	Working with People	
MALES	TT	4.1	13.6	4.9	3.8	2.0	2.8	13.5	3.1	4.1	12.8	TT
	AA	29.5	46.8	15.8	18.4	13.3	19.9	41.6	11.9	23.2	41.5	AA
	A	59.0	37.1	36.6	50.6	54.3	50.2	38.7	43.8	52.8	41.5	A
	BA	7.4	2.4	42.6	27.2	30.4	27.2	6.1	41.1	19.9	4.3	BA
FEMALES	TT	10.6	15.1	3.4	8.0	5.3	2.0	1.6	1.6	4.7	12.7	TT
	AA	35.4	53.4	17.5	24.4	24.6	12.7	9.8	7.2	28.8	44.0	AA
	A	49.7	30.6	40.8	53.8	57.6	40.7	39.9	44.6	54.6	40.4	A
	BA	4.3	0.8	38.4	13.8	12.5	44.6	48.7	46.6	11.9	2.9	BA
TOTAL	TT	6.6	14.2	4.3	5.4	3.3	2.4	8.9	2.5	4.4	12.7	TT
	AA	31.8	49.4	16.5	20.8	17.7	17.1	29.2	10.1	25.4	42.5	AA
	A	55.3	34.6	38.2	51.8	55.6	46.5	39.2	44.2	53.5	41.0	A
	BA	6.2	1.8	41.0	22.0	23.4	34.0	22.8	43.2	16.8	3.7	BA

NOTE.–TT = Top Ten Percent, AA = Above Average, A = Average, BA = Below Average.

–Average sample size was 796 for males, and 511 for females. However, there were slight variations from measure to measure due to missing data.

TABLE 1 Distribution of Ability Measures (in percentiles)

Standard Score	Mechanical Reasoning			Numerical Computation			Math Usage			Space Relations			Standard Score
	M	F	T	M	F	T	M	F	T	M	F	T	
76-80	99	99	99	99	99	99	99	99	99	99	99	99	76-80
71-75	99	99	99	99	99	99	99	99	99	99	99	99	71-75
66-70	99	99	99	99	99	99	99	99	99	99	99	99	66-70
61-65	99	99	99	98	96	97	99	99	99	99	99	99	61-65
58-60	97	99	99	96	91	93	98	99	99	96	99	98	58-60
55-57	96	99	98	93	86	89	95	98	96	93	98	95	55-57
52-54	93	99	96	88	80	84	91	95	93	88	94	91	52-54
49-51	82	98	90	81	72	76	81	87	84	80	90	85	49-51
46-48	72	93	84	75	64	69	67	76	72	70	83	77	46-48
43-45	57	88	73	63	50	57	53	61	57	58	73	66	43-45
40-42	39	77	58	48	35	41	45	52	49	45	61	53	40-42
35-39	23	57	40	31	22	26	36	43	40	30	40	35	35-39
30-34	10	30	20	14	10	12	18	24	21	15	20	17	30-34
25-29	3	11	7	5	4	5	5	7	6	6	10	8	25-29
20-24	1	2	2	1	1	1	0	0	0	2	3	3	20-24
	M	F	T	M	F	T	M	F	T	M	F	T	
Mean	42.6	35.8	39.1	41.7	44.5	43.1	41.7	39.8	40.7	42.0	38.8	40.4	Mean
S.D.	7.9	6.5	8.0	9.2	9.8	9.6	8.9	8.7	8.9	9.5	8.5	9.2	S.D.

Standard Score	Reading Skills			Language Usage			Clerical Skills			Nonverbal Reasoning			Standard Score
	M	F	T	M	F	T	M	F	T	M	F	T	
76-80	99	99	99				99	99	99	99	99	99	76-80
71-75	99	99	99				99	98	99	99	99	99	71-75
66-70	99	99	99				97	95	96	99	99	99	66-70
61-65	99	99	99				95	90	93	99	99	99	61-65
58-60	98	98	98				93	85	89	97	97	97	58-60
55-57	96	97	97				90	81	86	94	95	95	55-57
52-54	93	95	94				87	76	82	89	91	90	52-54
49-51	88	89	88	NOT YET			83	71	77	82	85	84	49-51
46-48	80	82	81	AVAILABLE			77	64	70	74	73	73	46-48
43-45	72	73	72				71	56	63	61	57	59	43-45
40-42	59	59	59				59	46	52	46	40	43	40-42
35-39	40	37	38				40	31	35	27	24	25	35-39
30-34	22	17	19				21	17	19	12	11	12	30-34
25-29	9	6	7				9	9	9	5	5	5	25-29
20-24	2	1	1				3	3	3	1	1	1	20-24
	M	F	T	M	F	T	M	F	T	M	F	T	
Mean	39.3	39.6	39.5				40.6	44.2	42.5	42.0	42.3	42.1	Mean
S.D.	9.0	8.1	8.6				10.9	12.7	12.0	8.5	8.2	8.3	S.D.

NOTE.–Average sample size was 721 for males, and 745 for females. However, there were slight variations from measure to measure due to missing data.

TABLE 2 Distribution of Vocational Interest Profile Scales (in percentiles)

Standard Score	Trades			Technical			Science			Health			Standard Score
	M	F	T	M	F	T	M	F	T	M	F	T	
76-80	99	99	99	99	99	99	99	99	99	99	99	99	76-80
71-75	99	99	99	97	99	99	97	99	98	99	96	98	71-75
66-70	96	99	98	92	99	96	90	97	94	98	88	93	66-70
61-65	86	99	93	76	98	87	78	91	85	92	73	83	61-65
58-60	73	99	86	59	96	78	66	84	75	82	55	68	58-60
55-57	58	97	78	44	92	68	51	74	63	72	43	57	55-57
52-54	41	94	67	28	81	55	36	62	50	62	34	48	52-54
49-51	25	84	55	18	68	44	26	53	40	46	24	35	49-51
46-48	15	70	42	12	54	33	18	42	30	29	16	22	46-48
43-45	9	57	33	7	41	25	9	29	19	19	11	15	43-45
40-42	5	43	24	4	31	18	5	20	12	13	8	10	40-42
35-39	2	28	15	2	18	10	2	12	7	6	4	5	35-39
30-34	1	14	7	1	6	3	1	5	3	1	1	1	30-34
25-29	1	7	3	1	2	1	1	2	1	1	1	1	25-29
20-24	1	3	1	1	1	1	1	1	1	1	1	1	20-24
	M	F	T	M	F	T	M	F	T	M	F	T	
Mean	54.4	41.7	48.0	56.8	45.4	51.0	55.8	49.2	52.5	51.0	56.6	53.8	Mean
S.D.	7.5	8.7	10.3	8.1	8.4	10.1	9.0	9.9	10.0	8.2	9.7	9.4	S.D.

Standard Score	Arts			Social Service			Business Contact			Business Detail			Standard Score
	M	F	T	M	F	T	M	F	T	M	F	T	
76-80	99	99	99	99	99	99	99	99	99	99	99	99	76-80
71-75	99	96	97	99	96	98	96	96	96	98	94	96	71-75
66-70	97	89	93	97	88	93	88	86	87	94	85	89	66-70
61-65	86	75	81	88	69	78	72	70	71	84	68	76	61-65
58-60	72	60	66	76	48	62	54	54	54	71	53	62	58-60
55-57	61	48	54	64	36	49	41	43	42	59	42	51	55-57
52-54	46	34	40	52	25	39	34	35	34	47	32	40	52-54
49-51	31	22	26	42	18	30	27	27	27	33	21	27	49-51
46-48	22	15	18	31	13	22	19	19	19	21	13	17	46-48
43-45	15	10	12	20	8	14	13	14	13	14	8	11	43-45
40-42	9	6	7	11	4	8	8	8	8	8	5	6	40-42
35-39	4	3	3	5	2	4	3	4	4	4	3	3	35-39
30-34	2	1	1	2	1	1	1	2	2	1	1	1	30-34
25-29	1	1	1	1	1	1	1	1	1	1	1	1	25-29
20-24	1	0	1	1	0	1	0	1	1	1	1	1	20-24
	M	F	T	M	F	T	M	F	T	M	F	T	
Mean	53.4	56.4	54.9	52.0	58.0	55.1	56.4	56.5	56.4	53.8	57.7	55.8	Mean
S.D.	8.7	9.4	9.2	8.9	8.9	9.4	9.7	10.4	10.0	9.0	9.9	9.7	S.D.

NOTE.–Average sample size was 674 for males, and 696 for females. However, there were slight variations from measure to measure due to missing data.

AFRO-AMERICAN/BLACK

TABLE 3 Percentage Distribution for H.S. Grades, Career-Related Competencies, and Personal Characteristics

HIGH SCHOOL GRADES

		ENGLISH	MATH	SOCIAL STUDIES	NATURAL SCIENCES	BUSINESS	VOCATIONAL	
MALES	A	3.4	4.6	7.3	3.2	7.4	19.8	A
	B	26.9	27.5	36.1	31.5	37.9	51.9	B
	C	58.4	50.2	47.1	52.2	46.0	24.6	C
	D	10.6	16.1	9.4	12.7	8.4	3.7	D
	F	0.7	1.6	0.2	0.3	0.3	0.0	F
	NT	1.3	3.7	5.3	11.7	53.3	26.2	NT
FEMALES	A	10.5	6.8	11.8	6.2	15.6	30.3	A
	B	49.9	28.4	40.9	36.9	48.9	52.3	B
	C	36.8	54.6	44.1	49.0	31.7	16.9	C
	D	2.7	9.8	3.2	7.7	3.6	0.4	D
	F	0.0	0.4	0.0	0.2	0.2	0.0	F
	NT	0.3	3.6	4.0	13.2	32.1	31.4	NT
TOTAL	A	7.1	5.7	9.6	4.7	12.3	24.8	A
	B	38.7	28.0	38.5	34.2	44.5	52.1	B
	C	47.3	52.4	45.6	50.6	37.4	21.0	C
	D	6.5	12.9	6.2	10.2	5.5	2.1	D
	F	0.4	1.0	0.1	0.2	0.3	0.0	F
	NT	0.8	3.6	4.7	12.5	42.6	28.8	NT

NOTE.–NT = Not Taken. Percentages for NT are based on *total group*. Percentages for letter grades are based on those students who took that course. Therefore, A–F = 100%.

–Average sample size was 680 for males, and 697 for females. However, there were slight variations from measure to measure due to missing data

CAREER-RELATED COMPETENCIES

		TRADES	TECHNICAL	SCIENCE	ARTS	SOC. SERVICE	BUS. CONTACT	BUS. DETAIL	
MALES	MANY	4.1	4.1	6.9	10.3	11.6	13.4	5.6	MANY
	SOME	49.5	53.3	45.5	41.1	48.0	31.3	37.9	SOME
	FEW	44.1	41.9	42.4	39.5	28.6	52.8	46.3	FEW
	NONE	2.3	0.7	5.1	9.0	11.8	2.6	10.2	NONE
FEMALES	MANY	1.6	1.1	5.0	14.2	14.8	9.5	9.5	MANY
	SOME	6.1	14.0	38.0	56.2	59.3	22.9	41.8	SOME
	FEW	38.0	74.6	46.8	27.4	19.4	61.5	40.2	FEW
	NONE	54.3	10.3	10.2	2.1	6.5	6.1	8.4	NONE
TOTAL	MANY	2.9	2.7	6.0	12.4	13.4	11.2	7.8	MANY
	SOME	28.6	34.6	41.7	49.4	54.3	26.8	40.1	SOME
	FEW	41.2	57.5	44.6	33.0	23.5	57.5	42.9	FEW
	NONE	27.3	5.3	7.7	5.2	8.9	4.5	9.2	NONE

NOTE.–Average sample size was 557 for males, and 616 for females. However, there were slight variations from measure to measure due to missing data.

[Continued]

TABLE 3 *[Continued]* Percentage Distribution for H.S. Grades, Career-Related Competencies, and Personal Characteristics

CAREER-RELATED PERSONAL CHARACTERISTICS (SELF-ESTIMATES)

		Academic Motivation	Work Motivation	Artistic Ability	Clerical Ability	English Ability	Math Ability	Mechanical Ability	Scientific Ability	Social Self-Confidence	Working with People	
MALES	TT	6.6	20.1	7.7	5.4	5.0	6.0	9.2	4.7	11.4	22.9	TT
	AA	23.8	43.6	18.7	13.1	16.6	20.1	32.2	12.1	25.2	42.4	AA
	A	63.7	34.2	42.9	50.1	60.1	52.2	50.6	51.7	53.1	31.7	A
	BA	5.8	2.1	30.8	31.4	18.3	21.8	8.0	31.4	10.3	3.1	BA
FEMALES	TT	10.8	22.1	5.4	7.6	5.5	3.1	2.4	3.5	11.7	21.9	TT
	AA	28.8	44.8	13.3	20.0	17.5	9.3	10.0	8.0	23.5	39.4	AA
	A	56.0	30.7	47.0	54.2	67.1	56.4	42.0	50.5	56.4	36.3	A
	BA	4.5	2.4	34.4	18.2	10.0	31.2	45.6	38.0	8.4	2.4	BA
TOTAL	TT	8.8	21.1	6.5	6.5	5.2	4.5	5.8	4.1	11.5	22.4	TT
	AA	26.3	44.2	15.9	16.6	17.0	14.6	20.9	10.0	24.3	40.9	AA
	A	59.8	32.4	45.0	52.2	63.6	54.4	46.2	51.1	54.8	34.0	A
	BA	5.1	2.3	32.6	24.7	14.0	26.5	27.1	34.8	9.4	2.7	BA

NOTE.–TT = Top Ten Percent, AA = Above Average, A = Average, BA = Below Average.

–Average sample size was 718 for males, and 741 for females. However, there were slight variations from measure to measure due to missing data.

MEXICAN-SPANISH/AMERICAN

TABLE 1 Distribution of Ability Measures (in percentiles)

Standard Score	Mechanical Reasoning			Numerical Computation			Math Usage			Space Relations			Standard Score
	M	F	T	M	F	T	M	F	T	M	F	T	
76-80	99		99	99		99	99		99	99		99	76-80
71-75	99		99	99		99	99		99	99		99	71-75
66-70	99		99	98		98	98		98	99		99	66-70
61-65	96		97	94		94	94		95	94		96	61-65
58-60	89		92	88		89	90		92	88		91	58-60
55-57	80		86	82		82	83		86	80		85	55-57
52-54	70		78	73		74	73		77	68		75	52-54
49-51	53		64	60		62	59		64	54		63	49-51
46-48	38		50	50		52	44		50	40		48	46-48
43-45	26		38	39		40	31		37	28		36	43-45
40-42	16		27	26		25	24		29	22		27	40-42
35-39	9		16	15		14	17		22	16		18	35-39
30-34	4		7	7		6	7		10	9		10	30-34
25-29	2		3	2		2	2		3	4		5	25-29
20-24	1		1	1		1	0		0	2		2	20-24
	M	F	T	M	F	T	M	F	T	M	F	T	
Mean	48.8		46.3	46.9		46.7	47.4		46.0	47.8		46.3	Mean
S.D.	8.5		9.0	9.6		9.5	9.4		9.8	10.4		10.2	S.D.

Standard Score	Reading Skills			Language Usage			Clerical Skills			Nonverbal Reasoning			Standard Score
	M	F	T	M	F	T	M	F	T	M	F	T	
76-80	99		99				99		99	99		99	76-80
71-75	99		99				99		99	99		99	71-75
66-70	99		99				98		98	98		99	66-70
61-65	97		96				95		94	93		94	61-6
58-60	93		92				91		89	87		89	58-60
55-57	89		89				86		84	81		84	55-57
52-54	83		83				78		76	70		72	52-54
49-51	73		72	NOT YET AVAILABLE			66		65	59		60	49-51
46-48	59		59				54		52	49		51	46-48
43-45	46		46				41		40	37		39	43-45
40-42	33		33				28		26	26		27	40-42
35-39	18		18				15		14	15		16	35-39
30-34	6		6				5		6	7		7	30-34
25-29	2		1				2		3	2		3	25-29
20-24	0		0				1		1	1		1	20-24
	M	F	T	M	F	T	M	F	T	M	F	T	
Mean	45.0		45.1				46.6		47.0	47.3		46.9	Mean
S.D.	8.7		8.6				9.3		9.6	9.8		9.7	S.D.

NOTE.--Average sample size was 368 for males, and 520 for total. However, there were slight variations from measure to measure due to missing data. The sample size was insufficient to provide data for females.

TABLE 2 Distribution of Vocational Interest Profile Scales (in percentiles)

Standard Score	Trades			Technical			Science			Health			Standard Score
	M	F	T	M	F	T	M	F	T	M	F	T	
76-80	99		99	99		99	99		99	99		99	76-80
71-75	98		99	96		97	97		98	99		99	71-75
66-70	93		95	91		94	92		93	98		96	66-70
61-65	83		88	80		86	82		85	95		90	61-65
58-60	70		79	66		76	72		77	90		82	58-60
55-57	55		68	51		64	58		65	83		75	55-57
52-54	37		54	34		50	44		52	75		66	52-54
49-51	22		40	23		38	33		41	58		50	49-51
46-48	12		29	15		28	21		30	39		34	46-48
43-45	7		21	8		19	12		19	25		22	43-45
40-42	3		15	4		13	6		12	15		14	40-42
35-39	1		8	2		7	3		7	6		6	35-39
30-34	1		4	1		2	1		2	1		2	30-34
25-29	1		2	0		1	0		1	1		1	25-29
20-24	1		1	0		1	0		1	1		1	20-24
	M	F	T	M	F	T	M	F	T	M	F	T	
Mean	55.4		51.4	56.0		52.4	54.3		52.2	48.9		50.6	Mean
S.D.	7.5		10.0	8.3		9.8	9.0		9.8	7.8		8.8	S.D.

Standard Score	Arts			Social Service			Business Contact			Business Detail			Standard Score
	M	F	T	M	F	T	M	F	T	M	F	T	
76-80	99		99	99		99	99		99	99		99	76-80
71-75	99		99	99		99	98		99	99		99	71-75
66-70	97		96	98		96	96		96	97		95	66-70
61-65	91		89	94		87	89		88	91		86	61-65
58-60	83		80	87		78	78		77	82		75	58-60
55-57	76		72	79		69	66		66	72		65	55-57
52-54	65		60	68		58	57		56	59		53	52-54
49-51	51		46	54		45	47		48	42		38	49-51
46-48	38		34	41		33	36		37	27		24	46-48
43-45	29		25	28		22	26		27	17		16	43-45
40-42	17		15	17		13	14		15	10		11	40-42
35-39	7		7	9		6	5		6	6		6	35-39
30-34	2		3	3		2	2		2	3		2	30-34
25-29	1		1	1		1	1		1	1		1	25-29
20-24	0		0	1		1	1		1	1		1	20-24
	M	F	T	M	F	T	M	F	T	M	F	T	
Mean	49.8		50.8	49.3		51.5	51.3		51.1	51.4		52.5	Mean
S.D.	9.1		9.5	8.8		9.4	9.3		9.5	8.6		9.2	S.D.

NOTE.—Average sample size was 356 for males, and 506 for total. However, there were slight variations from measure to measure due to missing data. The sample size was insufficient to provide data for females.

MEXICAN-SPANISH/AMERICAN

TABLE 3 Percentage Distribution for H.S. Grades, Career-Related Competencies, and Personal Characteristics

HIGH SCHOOL GRADES

		ENGLISH	MATH	SOCIAL STUDIES	NATURAL SCIENCES	BUSINESS	VOCATIONAL	
MALES	A	4.6	7.0	9.7	6.0	10.4	30.5	A
	B	26.1	27.8	36.9	31.2	41.8	41.1	B
	C	53.3	48.8	43.1	47.2	41.8	25.2	C
	D	15.4	14.6	9.7	15.0	5.0	2.8	D
	F	0.6	1.8	0.6	0.7	1.1	0.4	F
	NT	4.7	5.3	5.8	13.5	48.3	30.1	NT
FEMALES	A							A
	B							B
	C							C
	D							D
	F							F
	NT							NT
TOTAL	A	5.1	6.9	9.5	5.8	14.5	29.5	A
	B	31.0	28.3	38.8	31.0	43.1	44.0	B
	C	51.3	49.2	42.7	49.0	36.5	23.9	C
	D	12.2	14.4	8.7	13.4	5.3	2.4	D
	F	0.4	1.2	0.4	0.9	0.7	0.3	F
	NT	3.9	5.9	4.5	12.4	39.0	31.4	NT

NOTE.–NT = Not Taken. Percentages for NT are based on *total group*. Percentages for letter grades are based on those students who took that course. Therefore, A–F = 100%.

–Average sample size was 356 for males, and 502 for total. However, there were slight variations from measure to measure due to missing data.

CAREER-RELATED COMPETENCIES

		TRADES	TECHNICAL	SCIENCE	ARTS	SOC. SERVICE	BUS. CONTACT	BUS. DETAIL	
MALES	MANY	11.4	10.2	10.2	5.4	7.2	9.2	5.0	MANY
	SOME	61.2	55.7	40.7	28.5	33.6	32.3	35.4	SOME
	FEW	26.5	33.5	40.1	45.0	31.2	55.5	45.3	FEW
	NONE	0.8	0.6	9.0	21.0	28.1	3.0	14.3	NONE
FEMALES	MANY								MANY
	SOME								SOME
	FEW								FEW
	NONE								NONE
TOTAL	MANY	8.2	7.3	8.1	7.9	9.6	7.6	7.2	MANY
	SOME	45.6	41.8	37.1	34.6	35.4	27.6	41.2	SOME
	FEW	29.6	45.6	42.4	41.4	32.0	60.5	40.5	FEW
	NONE	16.6	5.3	12.4	16.1	22.9	4.3	11.1	NONE

NOTE.–Average sample size was 326 for males, and 460 for total. However, there were slight variations from measure to measure due to missing data.

[Continued]

MEXICAN-SPANISH/AMERICAN

TABLE 3 *[Continued]* Percentage Distribution for H.S. Grades, Career-Related Competencies, and Personal Characteristics

CAREER-RELATED PERSONAL CHARACTERISTICS (SELF-ESTIMATES)

		Academic Motivation	Work Motivation	Artistic Ability	Clerical Ability	English Ability	Math Ability	Mechanical Ability	Scientific Ability	Social Self-Confidence	Working with People	
MALES	TT	4.9	13.7	4.4	3.6	1.4	5.2	12.6	1.4	6.0	14.3	TT
	AA	32.9	50.6	22.7	17.4	14.0	17.5	40.0	12.0	23.4	42.0	AA
	A	56.7	33.2	36.3	50.1	56.3	55.2	40.8	41.5	52.8	40.4	A
	BA	5.5	2.5	36.6	28.8	28.3	22.1	6.6	45.1	17.9	3.3	BA
		Academic Motivation	Work Motivation	Artistic Ability	Clerical Ability	English Ability	Math Ability	Mechanical Ability	Scientific Ability	Social Self-Confidence	Working with People	
FEMALES	TT											TT
	AA											AA
	A											A
	BA											BA
		Academic Motivation	Work Motivation	Artistic Ability	Clerical Ability	English Ability	Math Ability	Mechanical Ability	Scientific Ability	Social Self-Confidence	Working with People	
TOTAL	TT	6.6	14.8	3.5	4.3	1.4	4.2	9.7	1.5	5.6	13.8	TT
	AA	33.1	49.7	21.8	18.6	13.8	14.9	29.8	8.7	23.8	40.5	AA
	A	54.6	33.8	38.2	52.9	61.0	53.5	39.6	40.5	52.9	42.8	A
	BA	5.8	1.8	36.5	24.2	23.9	27.4	20.9	49.2	17.6	2.9	BA

NOTE.–TT = Top Ten Percent, AA = Above Average, A = Average, BA = Below Average.

–Average sample size was 364 for males, and 516 for total. However, there were slight variations from measure to measure due to missing data.

GENERAL NOTE.–The sample size was insufficient to provide data for females.

APPENDIX D

INSTITUTIONS ADMINISTERING THE CAREER PLANNING PROFILE DURING THE NATIONAL NORMING PERIOD

The following institutions administered the Career Planning Profile during the national norming period. Only the institutions that have an asterisk before their name were included in the national norm group.

*Douglas MacArthur State Technical Institute, Opp, Alabama
*George C. Wallace State Junior College, Dothan, Alabama
*Jefferson State Junior College, Birmingham, Alabama
*Theodore Alfred Lawson State Junior College, Birmingham, Alabama
*Anchorage Community College, Anchorage, Alaska
*Central Arizona College, Coolidge, Arizona
*Maricopa Technical College, Phoenix, Arizona
*Navajo Community College, Chinle, Arizona
*Phoenix College, Phoenix, Arizona
*College of the Redwoods, Eureka, California
*College of San Mateo, San Mateo, California
*College of the Sequoias, Visalia, California
*College of the Siskiyous, Weed, California
East Los Angeles Junior College, Los Angeles, California
*Fresno City College, Fresno, California
*Gavilan College, Gilroy, California
*Los Angeles Pierce College, Woodland Hills, California
*Modesto Junior College, Modesto, California
*Pasadena City College, Pasadena, California
*Porterville College, Porterville, California
*Santa Barbara City College, Santa Barbara, California
*Santa Rosa Junior College, Santa Rosa, California
*Solano Community College, Suisun City, California
*West Hills College, Coalinga, California
*Aims College, Greeley, Colorado
*Community College of Denver-North Campus, Denver, Colorado
*Community College of Denver-West Campus, Denver, Colorado
Broward Junior College, Ft. Lauderdale, Florida
Central Florida Junior College, Ocala, Florida
Daytona Beach Community College, Daytona Beach, Florida
Edison Junior College, Ft. Myers, Florida
Florida Junior College, Jacksonville, Florida
*Hillsborough Junior College, Tampa, Florida
Lake City Community College, Lake City, Florida
*Lake County Area Vocational-Technical Center, Eustis, Florida
Lake-Sumter Community College, Leesburg, Florida
Lewis M. Lively Area Vocational-Technical Center, Tallahassee, Florida
Lindsey-Hopkins Education Center, Miami, Florida
Manatee County Vocational-Technical Center, Bradenton, Florida
*Manatee Junior College, Bradenton, Florida
Miami-Dade Junior College-North Campus, Miami, Florida
Miami-Dade Junior College-South Campus, Miami, Florida
*Mid-Florida Technical Institute, Orlando, Florida
*North Technical Education Center, Riviera Beach, Florida
Okaloosa-Walton Junior College, Niceville, Florida
*Palm Beach Junior College, Lake Worth, Florida
Pinellas Technical Education Center, Clearwater, Florida
Polk Community College, Winter Haven, Florida
*Polk County Vocational Technical Center, Bartow, Florida
*St. Johns River Junior College, Palatka, Florida
St. Petersburg Junior College, St. Petersburg, Florida
Santa Fe Junior College, Gainesville, Florida
*Sarasota County Vocational-Technical Center, Sarasota, Florida
Seminole Junior College, Sanford, Florida
*Sheridan Vocational Center, Hollywood, Florida
Tampa Bay Area Vocational-Technical Center, Tampa, Florida
*Valencia Junior College, Orlando, Florida
*Leeward Community College, Pearl City, Hawaii
*North Idaho Junior College, Coeur d'Alene, Idaho
*Vocational-Technical School, Idaho State University, Pocatello, Idaho
Black Hawk College, Moline, Illinois
*Carl Sandburg College, Galesburg, Illinois
*Kaskaskia College, Centralia, Illinois
*Parkland College, Champaign, Illinois
Vocational-Technical Institute, Southern Illinois University, Carbondale, Illinois
Drake University, Des Moines, Iowa
*Kirkwood Community College, Cedar Rapids, Iowa
*Cowley County Community Junior College, Arkansas City, Kansas
*Hutchinson Community Junior College, Hutchinson, Kansas
*Kansas City Area Vocational-Technical School, Kansas City, Kansas
*Kansas Technical Institute, Salina, Kansas

*North Central Area Vocational-Technical School, Beloit, Kansas
*Ashland Community College, Ashland, Kentucky
*Jefferson Community College, Louisville, Kentucky
*Somerset Community College, Somerset, Kentucky
*Allegany Community College, Cumberland, Maryland
*Catonsville Community College, Catonsville, Maryland
*Frederick Community College, Frederick, Maryland
Fisher Junior College, Boston, Massachusetts
*Kellogg Community College, Battle Creek, Michigan
*Anoka-Ramsey State Junior College, Coon Rapids, Minnesota
University of Minnesota Technical Institute, Crookston, Minnesota
*Jones County Junior College, Ellisville, Mississippi
*Flathead Valley Community College, Kalispell, Montana
*Western Nevada Community College (formerly Nevada Technical Institute), Reno, Nevada

*Camden County College, Blackwood, New Jersey
*Cape May County Vocational-Technical Center, Cape May Court House, New Jersey
*Ocean County College, Tom's River, New Jersey
*Union County Technical Institute, Scotch Plains, New Jersey
*New Mexico Junior College, Hobbs, New Mexico
*State University of New York Agricultural & Technical College, Alfred, New York
*Catawba Valley Technical Institute, Hickory, North Carolina
*James Sprunt Institute, Kenansville, North Carolina
*Lenoir County Community College, Kinston, North Carolina
*Nash Technical Institute, Rocky Mount, North Carolina

*Pitt Technical Institute, Greenville, North Carolina
*North Dakota State School of Science, Wahpeton, North Dakota
*Michael J. Owens Technical College (formerly Penta Technical College), Perrysburg, Ohio
*Eastern Oklahoma State College, Wilburton, Oklahoma
*Northern Oklahoma College, Tonkawa, Oklahoma
*Oklahoma State University-School of Technical Training, Okmulgee, Oklahoma
*Oklahoma State University, Technical Institute, Oklahoma City, Oklahoma
*Chemeketa Community College, Salem, Oregon
*Clackamas Community College, Oregon City, Oregon
*Portland Community College, Portland, Oregon
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ACT PUBLICATIONS RELATED TO THE CAREER PLANNING PROGRAM

The publications listed here may be obtained, if copies are available, by writing to: ACT Publications, P.O. Box 168, Iowa City, Iowa 52240. (If there is a charge, check or money order must accompany request.)

PROGRAM PUBLICATIONS

Career Planning Analysis Report, 1972. This report, which is prepared from two input documents—the Career Planning Profile and the Student Follow-Up Questionnaire—is sent to each institution participating in the Career Planning Analysis Service.

Career Planning Program Counselor's Manual, 1971-72. This new publication includes an extensive question-and-answer section concerning registering for and administering the Career Planning Profile, measures used in the Profile, and the Student Report. Other areas covered are basic career development concepts, test usage in general, and the use of the Career Planning Profile in counseling, guidance, and placement. A list of 106 educational programs and occupational choices is included. Free to program users. Additional copies are $1.00 each. If more than five copies are ordered at one time, the cost is $.50 each.

Career Planning Program Student's Booklet, 1971-72. Two sections include information to help the student understand basic concepts of career development and career decision making. Another section is devoted to using the Student Report in career planning. The booklet also includes a "Career Shopping List" that presents 106 educational programs (both vocational-technical and transfer) and occupations. A list of publications that may provide additional information needed to make educational and career plans is presented for those who wish to pursue in more detail the topics in the *Student's Booklet.* Each student who writes the Career Planning Profile receives the *Student's Booklet* at the time he or she receives his *Student Report.* Additional copies are $1.00 each. If more than five copies are ordered at one time, the cost is $.50 each.

Interpretive Guide for the Career Planning Analysis Service, 1972. This 64-page booklet describes how to use the information contained in the Career Planning Analysis Report. The booklet is sent to each institution participating in the Career Planning Analysis Service.

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Profile of Career Applicants, 1971. This report is sent to all institutions which received 25 or more CPF Student Reports. The report assists school officials in understanding the characteristics of their career applicants.

Your Career Applicants: Interpretive Guide for the Profile of Career Applicants, 1971. This publication describes the tables in the Profile of Career Applicants and is sent to each school receiving the Profile of Career Applicants. Additional copies are $1.00 each.

RESEARCH REPORTS

"The Accuracy of Self-Report Information Collected on the ACT Test Battery: High School Grades and Items of Nonacademic Achievement," *ACT Research Report No. 45,* July 1971, by E. J. Maxey and V. J. Ormsby. This paper reports the accuracy with which students report their high school grades and nonacademic achievements when they write the ACT Test Battery. A sample of 5,775 student records from 134 high schools was studied. The correlations between self-reported and school-reported grades were found to range from .81 to .86. $1.00

"An Analysis of the Structure of Vocational Interests," *ACT Research Report No. 40,* January 1971, by N. S. Cole and G. R. Hanson. The internal structural relationships of scales from the SVIB, the Kuder OIS, Holland's VPI, the MVII, and the new ACT Vocational Interest Profile were compared. The configurations of the scales for all the inventories were found to be similar and to conform to the circular configurations of interest proposed by Roe and Holland. The common configuration of vocational interests was used to reconcile previous contradictory research results about the comparability of interest scores from various instruments and as a basis for counselor interpretation. $1.00

"Bayesian Considerations in Educational Information Systems," *ACT Research Report No. 38,* November 1970, by M. R. Novick. The development during the past decade of guidance-oriented educational testing programs is surveyed together with the resulting need for statistical methods for educational information systems. Bayesian methods are described as being uniquely capable of combining prior, collateral, and direct experimental information to provide probabilistic statements about parameters descriptive of students, educational programs, and their relationships. The Bayesian statistical methods needed for these applications are described. $1.00

"Converting Test Data to Counseling Information," *ACT Research Report No. 44,* June 1971, by D. J. Prediger. This report is in two parts. In Part 1, objective procedures for converting test data into counseling information are discussed and illustrated with special attention being given to similarity (centour) scores and similarity score profiles. The similarity score profiles, when used in conjunction with success estimates, avoid many of the pitfalls inherent in Parsonian approaches to test interpretation. Part 2 describes a computer-based system incorporating the above data-information conversion procedure. The system was developed and field tested with potential vocational school students. Illustrations of the similarity score reporting procedures and student reactions to them are provided. $1.00

"How Do Community College Transfer and Occupational Students Differ?" *ACT Research Report No. 41,* February 1971, by E. J. Brue, H. B. Engen, and E. J. Maxey. This paper reports an examination of differences between and among community college students enrolled in transfer programs and in occupational programs. Seventy-nine variables are examined among students grouped by sex and program. (The men differ on 44 characteristics while the women differ on only 15.) Differences are reported regarding personality, various competencies, interest, academic aptitude, educational aspiration, self-reported characteristics, socioeconomic background, and other factors. The transfer men hold higher mean scores than occupational men on 35 of 44 variables. Among women students the distribution of significant differences is balanced. $1.00

"Influence of Financial Need on the Vocational Development of College Students," *ACT Research Report No. 36,* September 1970, by A. R. Vander Well. There is some evidence that financial need influences vocational development. To explore the relationship, four research issues were developed and related hypotheses were tested. The sample, drawn from four state-supported institutions, consisted of 291 students in the second semester of their second year of college. The *Financial Aid Group* was defined in terms of individuals who received assistance adequate to meet their financial need. The *Unmet Need Group* were those who did not receive sufficient assistance to meet their need. The third group, individuals who had not applied for financial assistance, was defined as the group without financial need, the *Nonapplicant Group.* The students with full financial aid tended to have a greater crystalized choice of their educational major and vocational goal than was true of students in the other two groups. Differences regarding college goal preferences among the research groups were not significant. All groups showed a strong preference toward vocationally oriented goals. $1.00

"On Measuring the Vocational Interests of Women," *ACT Research Report No. 49,* March 1972 by N. S. Cole. Analyses both of the interrelationships of scales on common interest inventories and of the interest patterns of women selecting various occupations support the similarity of the structure of women's interests to the structure previously found for men. It is recommended that this information be used to provide women with information about more and more diverse career options than now commonly available. $1.00

"Practices and Outcomes of Vocational-Technical Education in Technical and Community Colleges," *ACT Research Report No. 37,* October 1970, by T. G. Gartland and J. F. Carmody. A study of 2-year post-high school institutions offering vocational-technical education was conducted to provide more adequate information about institutional guidance and research programs. A questionnaire was sent to 351 vocational-technical schools that offered no transfer programs and a slightly different version was sent to 689 community or junior colleges offering both college transfer work and vocational-technical programs. Items sought information on the collection and use of standardized data, counseling services, involvement in institutional research, program completion and transfer rates of students, and graduates' success in acquiring employment directly related to their specialized education. Institutions that conducted follow-up studies on vocational-technical students were requested to return copies of these studies.

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